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VOLUME 17

**MOTION PICTURES, HISTORY OF
to NORWEGIAN MUSIC**

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LIST OF ABBREVIATIONS USED IN THE TEXT*

abbr.	abbreviated	fr.	from	OHG.	Old High German
AC; a-c	alternating current	Fr.	French	ON.	Old Norse
A.D.	<i>anno Domini</i> (Lat., in the year of the Lord)	ft.	foot	ONF.	Old Norman French
alt.	altitude	g	gram	O.T.	Old Testament
A.M.	<i>ante meridiem</i> (Lat., before noon)	Gael.	Gaelic	oz.	ounce
AM	amplitude modulation	gal.	gallon	P.M.	<i>post meridiem</i> (Lat., after noon)
amu or AMU	atomic mass unit	Ger.	German	Poi.	Polish
anc.	ancient	Gr.	Greek	pop.	population
Ar.	Arabic	Heb.	Hebrew	Port.	Portuguese
AS.	Anglo-Saxon	Hind.	Hindustani	prelim.	preliminary
A.S.S.R.	Autonomous Soviet Socialist Republic	h.p.	horsepower	pron.	pronounced
at.no.	atomic number	hr.	hour	q.v.	<i>quod vide</i> (Lat., which see)**
at.wt.	atomic weight	Hung.	Hungarian	r.	reigned
b.	born	Hz	hertz or cycles per second	R.	River
obl	barrel	i.	Island	rev.	revised; revision
B.C.	before Christ	i.e.	<i>id est</i> (Lat., that is)	R.R.	railroad
bd.ft.	board feet	in.	inch	Rum.	Rumanian
bev or BeV	billion electron volts	Ind.	Indian	Russ.	Russian
b.p.	boiling point	Ir.	Irish	Ry.	railway
B.T.U.	British Thermal Unit	It.	Italian	S.	south; southern
bu.	bushel	K.	Kelvin	sec.	second
Bulg.	Bulgarian	kg	kilogram	S.F.S.R.	Soviet Federated Socialist Republic
C.	centigrade	kH	kilohertz	Skr.	Sanskrit
cent.	century	km	kilometer	Sp.	Spanish
Chin.	Chinese	kw	kilowatt	sp.gr.	specific gravity
cm	centimeter	kw hour	kilowatt hour	sq.	square
Co.	County	lat.	latitude	sq.mi.	square mile
colloq.	colloquial	Lat.	Latin	S.S.R.	Soviet Socialist Republic
cu.	cubic	lb.	pound	St.; Ste.	Saint
Czech.	Czechoslovakian	long.	longitude	Sum.	Sumerian
d.	died	m	meter	Sw.	Swedish
Dan.	Danish	M.	Middle	temp.	temperature
DC; d-c	direct current	mev or MEV	million electron volts	trans.	translation
Du.	Dutch	mg	milligram	Turk.	Turkish
E.	east; eastern	MHz	megahertz	U.K.	United Kingdom
ed.	edition; editor	mi.	mile	U.N.	United Nations
Egypt.	Egyptian	min.	minute	U.S.	United States
Eng.	English	M.L.	Medieval Latin	U.S.A.	United States of America
est.	estimated	mm	millimeter	U.S.S.R.	Union of Soviet Socialist Republics
ev or EV	electron volt	mod.	modern	var.	variant
F.	Fahrenheit	m.p.	melting point	vol.	volume
fl.	flourished	m.p.h.	miles per hour	vs.	versus or against
FM	frequency modulation	Mt(s).	Mount, Mountain	W.	west; western
		N.	north; northern	yd.	yard
		Norw.	Norwegian		
		N.T.	New Testament		
		OE.	Old English		
		OF.	Old French		

*For a more extensive listing of abbreviations, widely used by authoritative sources in many fields, see ABBREVIATION. Charts of pertinent abbreviations also accompany the articles BIBLE, CANON OF THE; DEGREE, ACADEMIC; ELEMENTS, CHEMICAL; MATHEMATICAL SYMBOLS; and WEIGHTS AND MEASURES. Accent marks and special letters are explained in the article DIACRITIC MARK.

**The abbreviation (q.v.) stands for the Latin words "quod vide", meaning "which see". The placement of this abbreviation after a word—or a name or term—indicates that the word itself is the title of a separate article in the encyclopedia. By looking up the article on this word, or the entries on each word in a series that is followed by the plural form (qq.v.) of the abbreviation, the reader will find specific information about the words used as well as data about the main topic of the article he is reading.

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MOTION PICTURES, HISTORY OF, artistic and historical development of modern motion-picture production. For the technical aspects of the industry and the photographic and projection equipment involved, see MOTION PICTURE.

The 19th Century. One of the earliest of the scientific advances leading directly to the development of motion pictures was the publication in 1824 by the British scholar and physician Peter Mark Roget (q.v.) of a paper describing the principle known as the persistence of vision. According to that principle, the human eye retains an image for a fraction of a second longer than it is present. Subsequently scientists in Europe and the U.S. developed various devices to prove the principle. A typical device included a disk with images on both sides which merged into a single picture when twirled rapidly on its lateral axis. The device was used as a toy in most homes and was known as a Zoetrope. Small books of drawings which seemed to move when flipped by the thumb were made also. From such devices were developed more complex machines designed to animate hand-drawn pictures. One of the noteworthy machines was the praxinoscope. Devised by the French inventor Charles Émile Reynaud (1844–1918), the praxinoscope consisted of a revolving drum with a ring of mirrors in the center and a band of images placed on the inside wall of the drum. As the drum revolved the images appeared to come to life.

Meanwhile, with the improvement and development of various photographic processes, the possibility of substituting real-life images for the drawings became increasingly apparent. In 1861 the American inventor Coleman Sellers (1827–1907) patented the kinematoscope, a device consisting of paddle wheels on which were mounted specially posed photographs presenting successive stages of movement. By 1872 the speed of emulsions had so increased that the

British-American photographer Eadweard Muybridge (q.v.), using a battery of twenty-four cameras, was able to photograph the entire cycle of motion of a running horse. The French physiologist Étienne Jules Marey (1830–1904) meanwhile had begun research leading to the development of the first motion-picture camera. Marey's *chronophotographe* produced a succession of images upon a band of film that moved at a steady speed past an aperture. Marey's film base, however, consisted of oiled paper that buckled and tore. In 1889 the American inventors Hannibal Williston Goodwin (1822–1900) and George Eastman (q.v.) succeeded in coating strips of celluloid with photographic emulsion. The inventor Thomas Alva Edison (q.v.) made use of the celluloid film in his research into the problem of photographing objects in motion. Edison's progress thereafter was rapid and direct. Edison applied for patents on his kinetograph (camera) and his kinetoscope (viewing machine) in 1891. In the kinetoscope, a strip of film about 50 ft. long passed in an endless loop across the field of a magnifying glass, providing a moving-picture for the viewer. The first kinetoscope parlor, in which the machines were coin operated, was opened in New York City in 1894; later in the year parlors were opened in London and Paris.

The introduction into Europe of the Edison kinetoscope led to the development of motion-picture projection. In 1894 projection was achieved by a number of inventors, including the Frenchman Louis Jean Lumière (1864–1948), the Briton Robert W. Paul (1869–1943), and the American Charles Francis Jenkins (1867–1934). Edison acquired some of the patents and, as subsequent lawsuits revealed, freely borrowed others. In 1896 his projecting kinetoscope was given its commercial debut in New York City. **International Developments** (1895–1910). The first films made in the U.S. and in Europe were

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brief, flickering productions, each less than a minute long, and were designed solely to exploit the novelty of photographed motion, as in films of waves breaking on the shore, trains pounding down the track straight for the camera, and fashionable crowds strolling the avenues of European cities. More elaborate films began to be produced, when in 1893 Edison constructed a small, tarpaper-covered studio near his laboratories in West Orange, N.J., and invited vaudeville, circus, and dramatic actors to perform for the camera. The films produced were distributed in such places as fairgrounds, penny arcades, wax museums, and vaudeville houses. Because equipment had been standardized, pictures produced by such European firms as Lumière's and Pathé could be also shown in the U.S.

Early in 1896 the French magician Georges Méliès (1861–1938) began a series of films that explored and exploited the narrative potentialities of the medium. Méliès extended his subjects by linking individual scenes together through the so-called dissolve, which he obtained by cranking back the last few feet of a shot so that the start of the next shot is superimposed over it. His special effects, obtained by multiple camera runs and forced perspective, were designed to show an infant industry what could be done with the new sensitized rolls of film that were being threaded in motion picture cameras. In 1899 he filmed a reconstruction of the Dreyfus case (see DREYFUS AFFAIR) in ten short episodes and made a twenty-part version of *Cinderella*. He is best remembered, however, for his clever fantasies, including *A Trip to the Moon* (1902). Filmmakers everywhere soon began to imitate his techniques.

Rise of the American Film (1903–19). The first major American film was *The Great Train Robbery* (1903), directed by the inventor Edwin S. Porter (1870–1941). Although only eight minutes long, this film greatly influenced the development of motion pictures, featuring such innovations as intercutting, or switching back and forth from one scene to the other, and climaxing in a chase. In the production of this work Porter developed one of the fundamental techniques of film creation, that of shooting various scenes at various times and places, then editing them together quite arbitrarily to shape a work possessing logic and consistency. *The Great Train Robbery*, moreover, helped to enlarge the audience for motion pictures, especially in the small theaters known as nickelodeons, where it was a popular attraction for many years.

Until about 1912 most films were either short comedies and adventure stories, or photographed records of performances by notable actors and actresses of the period. Among films of the latter type, which were largely produced in France, was *Queen Elizabeth* (1912), notable for the performance of the French actress Sarah Bernhardt (q.v.). The first feature-length film exhibited in the U.S., it was imported by the American producer Adolph Zukor (1873–1976) despite the opposition of the Motion Pictures Patents Company, a trust consisting of the leading producers and distributors who from 1909 to 1912 dominated every phase of the American motion-picture industry. The power of the trust derived from the pooling of all basic patents in the manufacture and projection of motion pictures; thus, most theater operators were completely dependent on the trust for supplies of film and equipment. Among other things, the trust limited the length of films to one and, later, two reels, the latter equal to about twenty minutes of screen time, and refused to grant screen credit to players. Opposing the trust were numerous independent producers, some of whom had obtained cameras abroad. These producers attracted players from the established companies by providing screen credits and increased earnings. Under no strictures to limit the length of their productions, they extended to their directors a greater measure of freedom than was enjoyed by directors working for the trust companies. They thereby liberated the creative forces in the American film, and initiated a major period of artistic development and economic expansion.

The most influential of the new filmmakers was the producer and director David (Lewelyn) Wark Griffith (q.v.), who developed the basic techniques of the motion picture as an art form. Soon after arriving at the Biograph studio in 1908, he innovated the practice of placing the camera so that it could record the action most advantageously. He started his shots on significant action and stopped as soon as the action was completed. In addition, he moved the camera closer to the players, particularly in highly emotional scenes; he was the first director to use the closeup as a means of emphasizing details, gestures, and emotions. In search of a simpler acting style, he organized an informal stock company comprised largely of young, inexperienced actors, who were not unduly indoctrinated by stage technique. He experimented with lighting, camera angles, and the use of filters, masks, and soft-focus scrims over the lenses. In every way he sought to make the film

A scene from *The Birth of a Nation*; produced by D. W. Griffith, the motion picture was the first epic of the silent screen.

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a more intimate, vivid, and expressive medium. Griffith also experimented with cutting; he increasingly fragmented his scenes, breaking each into numerous separate shots. He discovered that not only the ordering but the timing of each shot had a significant effect on an audience. By leaving a shot on the screen a moment longer, he created a mood of relaxation; by constantly shortening the length of his shots, he produced an effect of accelerating excitement. The alternation of shots of varying lengths gave the entire picture a rhythmic momentum.

In the winter of 1912–13 Griffith completed *Judith of Bethulia* in four reels. The company executives, outraged at this violation of their policy, withheld the picture until late in 1914, when films of three, four, and five reels, most of them of foreign origin, had become common. Meanwhile Griffith had left Biograph and begun to work on the twelve-reel Civil War film *The Birth of a Nation* (1915), the first true epic of the screen. Fusing all his experience and employing an imagination that took full advantage of the visual and emotional effects inherent in his theme, Griffith created scenes of unprecedented power. The appearance of *The Birth of a Nation* marked the emergence of the motion picture as a full-fledged art form. Even more important was Griffith's *Intolerance* (1918), often considered the greatest motion picture ever made. An immense historical spectacle, it told four stories simultaneously, cutting from one historical epoch to another to achieve a rhythmic power never equaled in any subsequent film.

Between 1912 and 1915 American filmmakers

broke away from the so-called working-man's-theater concept and the naïve nickelodeon melodramas that had characterized the formative years. In 1914 the Strand Theater, the first motion-picture palace, was opened on Broadway in New York City. The theater, designed specifically to attract a middle-class audience, offered a feature picture, short subjects, and a stage production that included outstanding vaudeville and concert artists. The success of this theater encouraged producers to acquire interests in similar houses throughout the country. In order to assure a steady flow of films to their theaters, the larger firms adopted the form of decentralized production introduced by the director Thomas Harper Ince (1882–1924). Although Ince specialized in Westerns, notably those starring the popular actor William S. Hart (1872–1946), he also produced numerous so-called program pictures with dramatic, melodramatic, and romantic themes. As films became longer and the demands of his studio increased, however, Ince became unable to direct each production himself. Instead, he introduced the unit system, in which a production manager, responsible directly to the studio chief, was placed in charge of each picture. In this manner, a number of pictures could be produced simultaneously.

Another important pioneer of the period was Mack Sennett (q.v.), who was known popularly as the King of the Keystone Clowns. A director for an independent firm with a studio on the outskirts of Los Angeles, he soon found the pressures of expanding business too great to permit personal direction of each Keystone comedy.



The Keystone Kops, one of the many comic inventions of the American producer Mack Sennett.

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He surrounded himself with comedians, gag writers, stunt men, directors, and cameramen and produced many popular farces. Sennett held that each gag should be planted, pointed, and completed within 100 ft. of film, or in a little more than one minute of screen time. A master of timing, he would sit in at the final screenings of each film made on his lot and recommend ways to tighten and speed the action. Speed, he felt, concealed inconsistencies in his plots.

The increasing popularity of motion pictures during this period resulted largely from the work of the British actor and director Charlie Chaplin (q.v.). After appearing for a time in Sennett's films Chaplin developed the tramp character that brought him international renown. He subsequently produced, directed, and starred in his own films, receiving widespread acclaim for his comic genius and originality of expression. With Griffith and the popular performers Mary Pickford and Douglas Fairbanks (qq.v.), he formed the original United Artists company and thus became the first actor to dominate the increasingly lucrative motion-picture industry. During this period also the center of the industry was moved from its original location in New York City to the area of Hollywood (q.v.), Calif., where it developed on a massive scale throughout the 1920's.

European Film Production (1920-1930). At the end of World War I the motion-picture industry

declined in Great Britain and Italy, both of which had made important contributions to the early development of the medium. Similarly, the Scandinavian film industries, which had prospered through trade with Germany and the Allies during the war, were unable to compete in the new era of rising costs and Hollywood stars. In Germany, the Soviet Union, and France, however, the motion picture achieved a new artistic significance, marking an influential period in the development of the medium.

GERMANY. Early German films were strongly influenced by such artistic movements as cubism and expressionism (qq.v.), a notable example being *The Cabinet of Dr. Caligari* (1919), by Robert Wiene (1881-1938), and used costumes and settings to reflect the hallucinations of the principal character. A similar concern with the supernatural is found in such films as *Nosferatu* (1922), an early rendering of the Dracula story directed by F. W. Murnau (1889-1931), and *Metropolis* (1927), directed by Fritz Lang (1890-1976) and dealing with a robot world dominated by a superindustrialist.

By the mid-1920's the Germans' technical proficiency had made their motion pictures famous throughout the world. The huge studios of the Universum-Film-Aktiengesellschaft (U.F.A.), in Neubabelsberg, near Berlin, were the largest and best equipped in the world. Directors had almost limitless facilities. In the opening scene of Murnau's *The Last Laugh* (1924), for example, a scene filmed entirely on U.F.A. studio stages, the camera descends the elevator shaft into the

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lobby of a grand hotel, darts across the lobby to the revolving doors, through which are seen cars, taxis, and buses, and far across the avenue pedestrians silhouetted against the shop windows seem scarcely larger than dolls.

The Germans took the camera off its customary tripod and mounted it on wheeled dollies. Sets were constructed so that furniture or walls could be smoothly moved aside to admit the mobile camera. Cameras swung, dropped, rushed up to keyholes, and darted through traffic. The Hollywood studios soon began to imitate German lighting, settings, and photography and to acquire German stars, directors, cameramen, and set designers. Because of the emigration of its best talent, German films gradually declined in quality after 1925, becoming mere imitations of Hollywood productions.

THE SOVIET UNION. In the Soviet Union the film industry was nationalized in August, 1919, and placed under the People's Commissariat of Propaganda and Education. Most of the equipment had been destroyed or carried off during the revolution of 1917. The few cameras and scraps of film available were pressed into service to document the progress of the civil war on the various fighting fronts and to record the activities of the new government.

Such Soviet directors as Sergei Mikhailovich Eisenstein (q.v.), and Vsevolod Ilarionovich Pudovkin (1893-1953), both profoundly influenced by Griffith, contributed dynamism and power to

Soviet films between 1925 and 1930. Despite marked differences in techniques and theoretical approach, they shared the conviction that the role of the film in Soviet society was to instruct and inform with all the sharpness, realism, and power inherent in the motion-picture medium. Eisenstein's *Potemkin* (1925) and Pudovkin's *Mother* (1925) were re-creations of the abortive revolution of 1905; Pudovkin's *End of St. Petersburg* (1927) and Eisenstein's *Ten Days That Shook the World* (1928) commemorated the accession of the Bolsheviks to power in 1917. Despite the similarity of the themes, each director worked in a distinctive, characteristic style. In Eisenstein's early films the action is abrupt and elliptical, with an emphasis on unusual visual images, as in the famous "Odessa steps" sequence in *Potemkin*, where a scene of political rebellion is climaxed by shots of a baby carriage, with the infant inside, hurtling unattended down a long flight of steps. Pudovkin preferred a poetic juxtaposition of images in his editing; he would alternate shots of a gathering crowd, for example, with images of the breakup of an ice floe. Pudovkin spoke of his editing method as a system of linkages; Eisenstein spoke of his in terms of "shock attractions".

The Soviet classics produced a profound effect on Western intellectuals, critics, and film-

Expressionist sets were used by the German director Robert Wiene in The Cabinet of Dr. Caligari (1919).

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A scene from *The Passion of Joan of Arc* (1928), produced by the Danish producer Carl Dreyer.

makers. Quite apart from ideological content, Soviet films introduced an element of passion, an epic sweep, and a note of intellectuality found nowhere else. Both Eisenstein and Pudovkin were excellent writers; their analyses of their own films and their expositions of the theoretical bases of their art were translated and published in film magazines. As their fame grew, both men were invited abroad to speak; Eisenstein came to the U.S. in 1930. The Soviet cinema contributed only tangentially to the American film, but it provided a supremely important direction and esthetic to experimental movements in Europe.

FRANCE In France, after World War I, the rebirth of the film industry resulted largely from the initiative and enthusiasm of such individuals as the author and critic Louis Delluc (1890–1924). The films produced by Delluc and his circle, which included Germaine Dulac (1882–1942), Dimitri Kirsanoff (1889–1957), Marcel L'Herbier (1890–), and Jean Epstein (1897–1953), were varied in content and tone. Many were intimate and impressionistic studies of French lower-class life, notably Kirsanoff's *Menilmontant* (1924) and Delluc's *Fièvre* (1922). Delluc's films were characterized by a fatalistic atmosphere that would become one of the hallmarks of the French film in the next two decades. By far the most important figure in the French cinema of this period was Abel Gance (1889–). Like Griffith, Gance was attracted to subject matter that was romantic, melodramatic, historical, and often huge in scope. Gance's greatest achievement is *Napoleon* (1927), in which he introduced a forerunner of the modern wide-screen technique and split the screen into as many as thirty-two separate images.

The French mode of production favored the individualistic filmmaker. Studios were small,

and their facilities could be rented as needed by independent filmmakers working on a single production. As a result, overhead was reduced to a minimum, and directors, who were often their own producers, could realize their pictures with a minimum of executive interference. The pictures they created reflected the tastes and talents of their makers to a degree unparalleled in other nations. Typical of French production in the 1920's was *The Passion of Joan of Arc* (1928), made in France by the Danish director Carl Dreyer (1889–1967). A reverent, deeply felt account of Joan's trial and execution, it had an international cast and crew, and its style, including huge closeups and considerable camera movement, was both individual and representative of the best from the Scandinavian, Soviet, and German schools.

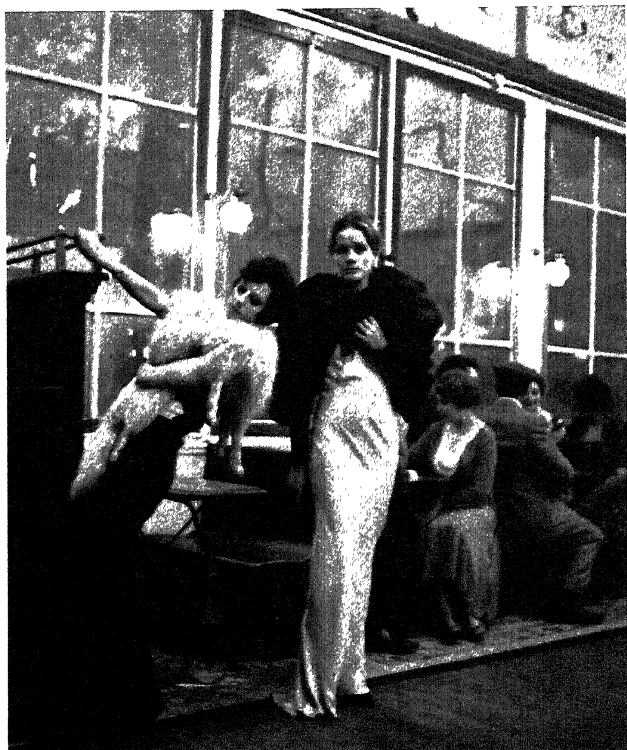
The Silent Film in Hollywood (1920–1929). After World War I motion-picture production became a major American industry. The most successful producers acquired millions of dollars in assets, including studios and costly equipment, large-scale ranches for the shooting of Westerns and other location pictures, and extensive theater holdings. Hollywood continued to adopt European techniques and import the artists responsible for successful European films. Thus, by the mid-1920's, the American film had become international in character. The period was also characterized by the development of the star system, in which such actors as Rudolph Valentino (q.v.) became prominent, and by an attempt to regulate the moral values of films. This effort resulted largely from the work of the American politician Will H. Hays (q.v.).

Despite the limitations imposed on directors by such purely commercial considerations as budgets, schedules, censorship, and casting, the art of the film continued to advance throughout the 1920's. Audiences were fascinated by the sophisticated films of Ernst Lubitsch, Erich Von Stroheim (qq.v.), and Cecil Blount De Mille (see *under De Mille*). Lubitsch abandoned the spectacle films that had made him famous in Germany and turned to intimate, romantic comedies notable for their dazzling technique and for their light treatment of such subject matter as adultery and premarital relations. Before turning to the spectacles of his later career, De Mille, in such films as *The Affairs of Anatol* (1921), treated subjects similar to Lubitsch's, emphasizing the position of the newly emancipated woman. Von Stroheim's work, harsher and more European in tone than De Mille's or Lubitsch's, pitted American innocence against European decadence in *Foolish Wives* (1922)

Motion Pictures. Plate 1.
 Right: Elaine May, feminine star and director of *A New Leaf*, is shown with costar Walter Matthau in a scene from the wry comedy about marriage for money. Below: Ali McGraw and Ryan O'Neal are the young couple in *Love Story*, the film version of Erich Segal's phenomenally best-selling novel about a bittersweet courtship and marriage.

Paramount





Paramount

Motion Pictures. Plate 2.
Left: A scene from The Conformist, a story of moral decadence, marriage, and infidelity set in fascist Italy of the 1930's and starring Jean-Louis Trintignant, Stefania Sandrelli, and Dominique Sanda. Below: Katharine Hepburn (left) and Vanessa Redgrave star in The Trojan Women, a film adaptation of Euripides' tragedy about the women of Troy who were sent into slavery after their men were defeated and slain by the Greeks.

Cinerama Releasing Corp.



Cinerama Releasing Corp

and caustically criticized avarice in American society in *Greed* (1924).

Most American filmmakers, unlike Von Stroheim, considered themselves craftsmen rather than artists, but they were often masters of their craft, especially in the economy of artistic and technical methods found in the Westerns and the comedies. The camera work was functional rather than tricky or elaborate; the editing was often a marvel of precision. The Westerns and comedies produced such outstanding American directors as Frank Capra, John Ford, William Wyler (q.v.), and George Stevens (1905–75). Notable contributions to the development of the documentary film, featuring nonfictional locales and events, were made during this period by the American explorer and producer Robert Joseph Flaherty (q.v.).

Outside the studios of Hollywood, there was one contribution of lasting importance. These were the films of Robert Flaherty, the documentary filmmaker. The factual film, important in the first days of the cinema, had lost much of its popularity and prestige during the ensuing years. Flaherty's first important film, *Nanook of the North* (1922), was a study of Eskimo habits and was sponsored by a fur-manufacturing firm. Flaherty brought a new approach to the problem of dramatizing reality for the camera. Instead of the impersonal feeling found in most previous and subsequent films of actuality, Flaherty was warm, human and intimate. *Nanook of the North* was a huge success upon its release and began a vogue for travelogue and documentary films. Later, it was criticized for presenting a romantic and slightly fictionalized account of Eskimo life. Nonetheless, this film as well as Flaherty's later works, *Moana* (1926), *Man of Aran* (1934), and *Louisiana Story* (1948), influenced the course of documentary filmmaking.

The 1920's was also the golden age of screen comedy, as exemplified by Chaplin, Joseph ("Buster") Keaton, Harold Lloyd (q.v.), and Harry Langdon (1884–1944). These comedians grew out of the slapstick Sennett tradition; by the 1920's, however, screen comedy had expanded to feature-length films, and the comedians had more time to develop gags and to elaborate upon their characterizations. Each of the comedians had his own distinct personality: Chaplin continued to develop his tramp character, adding deepening touches of pathos to the comedy; Keaton was known as the "great stone face" because he did not express any facial emotion; Langdon was a baby-faced simpleton; Lloyd played the all-American average boy.

The Sound Era. In 1926 the Warner Brothers studio introduced the first practical sound films, using a process known as Vitaphone to record musical accompaniments and brief passages of dialogue. In 1927 the Fox Studios launched a similar program, and its Movietone News created considerable excitement with its camera and microphone record of the triumphal return from Europe of the American aviator Charles Augustus Lindbergh (q.v.) after his solo flight to France. In October, 1927, Warner Brothers presented its first talking film, *The Jazz Singer*, featuring the American actor and singer Al Jolson (q.v.). The immediate success of that film signaled the end of the silent era.

As Hollywood proved that so-called talkies could be made successfully, the industries abroad had no alternative but to follow. The U.S. brought forth two sound-recording systems, namely Vitaphone, a sound-on-disk system developed by Bell Laboratories and Movietone, based on the researches of the American inventor Lee De Forest (q.v.). The Movietone system recorded sound in varying striations of gray directly on the film itself. The European systems, notably the German Tobis Klangfilm and the Soviet Shorin system, were also sound-on-film. The resultant conflict over the various systems was resolved in 1931 by a patents pool arranged by the Radio Corporation of America and Western Electric Company in favor of sound-on-film. Thus the free interchange of talking pictures throughout the world became possible. In all countries studios turned to the stage for plays and for trained performers who could project the spoken word gracefully.

Many of the directors who had mastered the techniques of the silent film, however, were at first unwilling to abandon the medium. Lubitsch was one of the first directors to break away from a pedestrian approach to the new technique. In his *Love Parade* (1929) he moved the camera with freedom and synchronized the action of his performers to a musical score that was dubbed into the film. The charming early pictures of the French director and producer René Clair (q.v.), such as *Sous les Toits de Paris* (1929), *Le Million* (1931), and *A Nous la Liberté* (1931), contained a bare minimum of dialogue. For the rest, the sound track consisted of music and effects recorded after the filming, thus allowing the widest latitude in shooting and editing. Other directors, including Lang, Josef von Sternberg (1895–1970), and King Vidor (1896–) explored the possibilities of evocative sound, that is, sound from an unseen source. Even before the technicians had mastered the

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problems of editing sound from more than one microphone, some directors, including Rouben Mamoulian (1897–) contrived nonmechanical methods of producing desired effects.

The film genres of the early 1930's also contributed to this liberating process. After a plethora of so-called canned dramas and canned musicals the public turned eagerly to taut, racy, laconic gangster films such as *Little Caesar* (1930). The dialogue of these films was pungent, colorful slang, and the action was often violent. The genre required a terse style of editing that took its cue from the dialogue.

Early in 1933 Warner Brothers started the vogue for musicals, notably in *42nd Street*, a somewhat banal backstage story enlivened by numerous elaborate and imaginative production numbers staged with notable cinematic skill by the dance director Busby Berkeley (1895–1976). In dozens of films for Warner Brothers and Metro-Goldwyn-Mayer, Berkeley extended the range of the sound camera, pushing it to extremes never attempted before.

By the mid-1930's the camera was being used in a relatively simple sequence of shots, while dialogue, notably that in the scripts of such American writers as Dudley Nichols (1895–1960), Nunnally Johnson (1897–), and Ben Hecht (q.v.), had become increasingly realistic and expressive. Popular films included biographical studies of famous persons, as in *The Life of Émile Zola* (1937), starring the German-American actor Paul Muni (q.v.), and adaptations of such classics as *David Copperfield* (1935) or *A Tale of Two Cities* (1935). The most commercially successful and in many ways the most typical American film of this period was *Gone With the Wind* (1939), adapted from the extremely successful novel by the American author Margaret Mitchell (q.v.) and produced by David Oliver Selznick (1902–65).

Most directors of the period were concerned primarily with providing vehicles for such well-known performers as Bette Davis, Greta Garbo, Katharine Hepburn, Humphrey Bogart, Clark Gable, and Cary Grant (qq.v.). The director's function was to discover the essential personality of the player and develop it in terms of the character described in the picture. The director also mastered new staging methods more consonant with the new medium. The process of editing was slowed considerably by the addition of the sound track. Directors found that by swinging their cameras abruptly from one part of a scene to another or by using lengthy shots in which the camera approached the scene gradually, they could impart some of the visual

effect of a cut without breaking into the emotional flow of the scene itself. The directors John Huston (see under HUSTON), Elia Kazan (q.v.), and others specialized in camera placement, framing each shot to accentuate the relationships suggested by the dialogue.

The actor and director Orson Welles (q.v.) greatly extended the vocabulary of the talking film. Coming to Hollywood in 1940, Welles brought fresh ideas in the handling of speech and commentary, an appreciation of the possible contributions of sound effects and music, and an urge to experiment. His passion for sharp-focus, wide-angled photography, first-person narration, and the shorthand of associative editing, which were displayed in such early films as *Citizen Kane* (1941) and *The Magnificent Ambersons* (1942), influenced the work of virtually every major filmmaker.

Although the techniques of the sound film are fairly universal, the themes tend to vary from country to country. The French, for example, while continuing their tradition of individuality, produced such eloquent dramas as *Grand Illusion* (1937) by the French director Jean Renoir (see under RENOIR). One of the most highly regarded of all filmmakers, noted for his subtle portrayal of character and exquisite sense of timing, Renoir subsequently directed such masterpieces as *The Rules of the Game* (1939). Two poetic films by Jean Vigo (1905–34), *Zéro de Conduite* (1933) and *L'Atalante* (1934), had considerable influence on later filmmakers. France continued to be a cosmopolitan film center, attracting such directors as the Austrian Max Ophüls (1902–57), known for the sophisticated and technically brilliant films *La Ronde* (1950) and *Lola Montès* (1955). Great Britain, apart from the films of the director Alfred Joseph Hitchcock (q.v.), who later directed many notable films in the U.S., did not emerge as a significant factor in film production until shortly before World War II. *The Stars Look Down* (1939) and *Odd Man Out* (1946), both directed by Sir Carol Reed (1906–76), represented the most significant British cinema in their studies of the interaction of personality and environment. Several of Shakespeare's dramas were superbly produced and directed for the screen by Sir Laurence Olivier (q.v.).

The most significant contribution England made to the cinema during the 1930's and early 1940's was in the field of the documentary. The leader of the British documentary movement was John Grierson (1898–1972). Grierson saw in the film a means of closing gaps in understanding and sympathy within an increasingly com-



Above: The American director Victor Fleming, foreground, giving directions to Clark Gable and Vivien Leigh on the set of *Gone With the Wind* (1939). Right: Ginger Rogers and Fred Astaire made many popular Hollywood musicals in the 1930's.



plex society. He gathered around him journalists, poets, teachers, scientists and filmmakers, all of them dissatisfied with their influence on the affairs of the world and all of whom wished to awaken the private citizen to the problems of the government. Needing financing for this movement, Grierson approached the government and received aid. Out of this movement came many of the classic documentaries, among them *Granton Trawler* (1934), *Song of Ceylon* (1934), *Housing Problems* (1935), and *Night Mail* (1936). These films influenced documentary filmmaking everywhere, but particularly in the U.S., as in *The Plow that Broke the Plains* (1936) and *The River* (1937), both made by Pare Lorentz (1905–).

The film in the Soviet Union during and after the war was regarded primarily as a means of bringing the theater, ballet, and opera to the people, and of portraying Soviet heroes. Eisenstein, however, directed two notable films during this period, *Alexander Nevsky* (1938) and *Ivan the Terrible* (1944–46). In Germany, throughout the years of the Nazi dictatorship, the film was regarded primarily as a means of propaganda; among the German pictures in this genre



Hanne Andersson and Lars Passgård in a scene from *Through a Glass Darkly* (1961), a gothic-style motion picture by the Swedish director Ingmar Bergman. Janus Films

were the large-scale documentaries of National Socialist Party activities produced by the actress and director Leni Riefenstahl (1902–).

After World War II both Italy and Japan developed important national cinemas. The neorealist movement initiated by the Italian director Roberto Rossellini (q.v.) with his *Open City* (1945) was at once impressive and pervasive. The neorealist directors used amateur actors against natural backgrounds, as in Rossellini's *Paisan* (1946), and in *Shoeshine* (1946) and *Bicycle Thief* (1949) by Vittorio De Sica (q.v.). Meanwhile Japanese directors, guided by the precepts of the so-called new humanism, reworked classic themes and plays with emphasis on the personal problems involved. The formal elements of Japanese art persist in such films as *Rashomon* (1951), an early work of the notable Akira Kurosawa (q.v.), *Ugetsu* (1953), directed by Kenji Mizoguchi (1898–1956), and *Gate of Hell* (1954), by Teinosuke Kinugasa (1898–), but serve to enhance the philosophical and intellectual overtones of these pictures. Japanese use of color has set new standards for filmmakers throughout the world.

Color movies were placed in general circulation after World War II, although films had been produced intermittently in various color processes since 1906. These processes, which included Kinemacolor, Prizmacolor, and the earliest type of bi-pack, or two-color, Technicolor proved unsuccessful, producing fuzzy, eye-straining prints with faulty color value. In 1933, however, Technicolor perfected its present tripack process. *Becky Sharp* (1935) was the first feature to use the new system, but the added cost of production and the public's marked indifference militated against widespread adoption by the industry. After *Gone With the Wind*

appeared, however, audiences agreed that the color had added materially to the visual appeal of the film. From that time on the proportion of films shot in color as against black and white began to rise sharply, both in the U.S. and abroad. By 1970 nearly all commercial films were made in one of the various color processes. See PHOTOGRAPHY: *Color Photography*.

The Wide-Screen Era. After World War II the popularity of the motion picture was challenged by the spread of television (q.v.). Weekly attendance figures declined from an estimated 85,000,000 during the war to approximately 45,000,000 in the late 1950's; the number of theaters in the U.S. fell from 20,000 to less than 17,000 during the same period. Undoubtedly, these losses would have been greater still had the industry not countered with movies creating the illusion of a third dimension. In 1952 Cinemascope, a system employing a wide, curving screen and an image supplied by three interlocked projectors, was introduced. Cinemascope was so well received that the industry instituted an immediate search for a more economical and practical substitute. The next development was a stereoscopic process known as polaroid 3-D, in which the films are photographed with two cameras from slightly different angles, the projectors are equipped with polaroid lenses, and the audience is required to wear polaroid spectacles. Audiences soon tired of the spectacles and of the novelty, and by the end of 1952 pictures that had been filmed in 3-D were released in conventional two-dimensional form.

Twentieth-Century-Fox meanwhile had acquired the rights to a process known commercially as CinemaScope. This process employs anamorphic lenses that produce an extrawide image on ordinary 35-mm film. The Cinema-

Scope projector uses compensating lenses to spread the picture across a vastly elongated screen in the theater. Twentieth-Century-Fox introduced the process with a \$5,000,000 production of *The Robe* (1953), adapted for the screen from a novel written by the American clergyman Lloyd Cassel Douglas (q.v.). Although CinemaScope was not as impressive or spectacular as Cinerama, it was an eminently practical system. Within the next few years theaters throughout the world installed CinemaScope screens. Shortly thereafter, Paramount introduced VistaVision, a system where by an image is photographed on a double-sized negative that travels horizontally through the special camera shuttle, then optically reduced in the printing to produce a normal 35-mm frame. VistaVision permits extreme magnification without loss of detail or intensity of color. Other systems, including Technirama, Metro-Goldwyn-Mayer's Camera 65, and short-lived CinemaScope 55 all are similar, their primary differences lying in their aspect ratios, that is, the ratio of the screen's width to its height. Only one of the new processes, namely Todd-AO, introduced in 1955 with *Oklahoma!*, departs from the normal 35-mm-film base; the widescreen effect is produced by shooting on 65 mm film and projecting an ultrawide, 70 mm film. Cinemiracle, presented in 1958, proved to be a refinement and simplification of the Cinerama process.

To display these new devices effectively the studios turned to a program of costly super-spectacles, star-studded musicals, and stories with colorful, exotic backgrounds. They added stereophonic sound and used color more intensively than ever before. Expenses began to mount; *Cleopatra* (1964), directed by Joseph L. Mankiewicz (q.v.) and costing more than \$20,000,000, was the most expensive film ever made. By the end of the 1960's a major motion picture could rarely be produced for less than \$3,000,000. Nevertheless, although aggregate attendance figures continued to fall, the American public responded favorably to such wide-screen spectacles as *The Sound of Music* (1965), *Dr. Zhivago* (1966), and *2001: A Space Odyssey* (1967).

The new wide-screen techniques placed a heavy artistic burden upon the film directors. With vast areas to fill, they encountered difficulties in using the closeup and in moving the camera. Perhaps most vexing of all was the problem of composing for the new screen shapes. For the most part, directors began to rely increasingly on stage techniques, leading the eye from point to point in the frame

through a calculated use of movement, light, and color. They quickly learned that some of the intimacy of the old screen size could be preserved by throwing the sides of their close shots into deep shadow. In addition, they compensated somewhat for loss of mobility in the editing process by various shooting techniques that involve use of the camera mounted on dollies or tracks, or making simple panoramic shots.

The 1960's and Recent Trends. Despite new techniques, the audiences for films produced in Hollywood continued to decline during the 1960's. The extensive influence of television, and the successful use of color in that medium, generally changed the nature of the motion-picture audience, which became increasingly composed of young people, often those seeking a greater intellectual sophistication than the typical Hollywood filmmaker could provide. European and Japanese films, which had previously been confined to a few so-called art theaters in major cities, began to be widely distributed throughout the U.S., drastically changing the nature of American motion pictures.

After the Italian neorealists the first filmmaker to attain international recognition was the Swedish director Ingmar Bergman (q.v.), who brought to the motion picture an intellectual depth that it had rarely before achieved. Having dealt in such films as *Prison* (1948) and *Sawdust and Tinsel* (1953) with problems of individual isolation and sexual conflict, he presented notable studies of human mortality in *The Seventh Seal* (1956), set in the form of a medieval allegory, and *Wild Strawberries* (1957), a poetic study of an old man. Although Bergman produced an occasional witty comedy, as in *Smiles of a Summer Night* (1955), his work during the 1960's acquired a profound religious depth, notably in *Through a Glass Darkly* (1961). His skill in portraying personal relationships was a remarkable feature of *Persona* (1966), and in *Shame* (1968) he depicted the effects of war on the human personality. The visual aspects of Bergman's films, with their subtle lighting effects and memorable landscapes, formed an appropriate setting for his philosophical concerns.

The Spanish director Luis Buñuel (1902–), who had begun his career during the 1920's in collaboration with the Spanish painter Salvador Dalí (q.v.), became especially prominent after 1960. Like Bergman, he dealt with problems of religious hypocrisy and sexual repression in such films as *Viridiana* (1960) and *Belle de Jour* (1967). Working within the context of a traditional cinematic narrative form, he often startled audiences with his striking visual symbol-

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ism and with his audacious approach to political and religious questions.

Less consciously philosophical than Bergman and Buñuel, but even more influential in his interpretations of contemporary society, was the Italian director Federico Fellini (q.v.). After working with Rossellini on a number of Italian neorealist films, Fellini began to develop a highly personal and poetic approach to his studies of outcasts and wandering artists, achieving a major success with his *La Strada* (1954), a highly stylized story of circus performers, and *Nights of Cabiria* (1956), in which he portrayed varied levels of Italian society. His social commentary became especially prominent in *La Dolce Vita* (1959), a vivid account of religious and social decadence. Fellini's most influential film, however, was the autobiographical *8½* (1963), in which he depicts the problems of a film director haunted by fantasies and images from his past. This film, with its free approach to narrative structure and its mingling of fantasy and reality, influenced many directors of the period and greatly liberated the motion-picture medium. In Fellini's *Satyricon* (1969), Fellini returned to a consideration of social decadence.

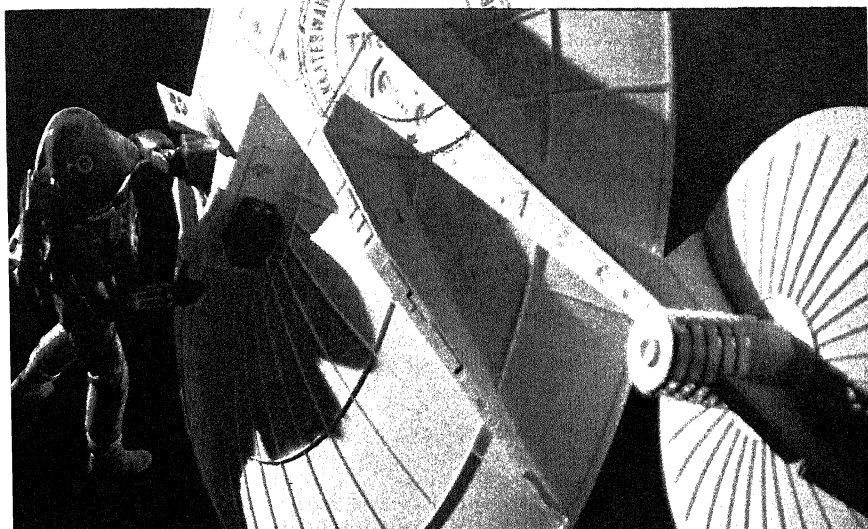
François Truffaut, noted French film director, portrays a director reassuring a distraught actress in Day for Night (1973).

Warner Bros. Inc.

using ancient Rome as an allegory of modern society.

The philosophical concerns of Bergman and the social commentary of Fellini were paralleled in the work of perhaps the most widely-discussed director of the 1960's, the Italian Michelangelo Antonioni (q.v.). His first major film to attain international recognition, both for its profound study of human relationships and for its subtle visual imagery, was *L'Avventura* (1959). Antonioni's principal philosophical theme, the inability of man to adjust emotionally to an increasingly complex technological society, was developed in *La Notte* (1960) and *Eclipse* (1962). Both films utilized an extremely oblique narrative containing little overt action but so carefully organized that the slightest gesture seemed to be highly significant. Antonioni's visual compositions, often showing characters against vast expanses of landscape, architecture, or machinery, emphasized his concern with human isolation, and his use of color, first in *Red Desert* (1966) and in his later films, contributed strikingly to his evocation of the moods of his characters. *Blow-Up* (1968), his first film in a non-Italian locale, depicted the confused reactions of a young British photographer to a number of mysterious events, and *Zabriskie Point* (1969) dealt with the attitudes of a young American girl





to the apparent disorder of the society around her.

In France the long tradition of individualistic filmmaking, which had found expression during the 1950's in the austere films of Robert Bresson (1907–), culminated with a movement known as *la nouvelle vague* ("the new wave"), comprising a group of highly original and creative young directors. Influenced by the work of American directors, and in particular by the American films of Alfred Hitchcock and Howard Hawks (1896–1977), these young filmmakers expressed their view of the art in the periodical *Cahiers du Cinema*, where they proposed the so-called *auteur* theory of filmmaking. This theory holds that the director is the true author of a film and that the film must bear the imprint of the director's personality, as, they believed, many American films had done, despite the restrictions of subject matter and studio control to which American filmmakers were subjected. The first exponents of the new wave were François Truffaut (q.v.), noted for his poetic studies of the growth of a young man, as in *The 400 Blows* (1959) and *Stolen Kisses* (1968), and Claude Chabrol (1903–), a master of cinematic narrative in such films as *The Cousins* (1959) and *La Femme Infidèle* (1969). Alain Resnais (1922–), working in collaboration with such literary figures as the influential novelist Alain Robbe-Grillet (1922–), directed the elaborate films *Hiroshima, Mon Amour* (1959) and *Last Year at Marienbad* (1963), in which images of

A scene from 2001: A Space Odyssey (1968), directed by Stanley Kubrick and considered a milestone in cinematic special effects.
Metro-Goldwyn-Mayer, Inc.

past, present, and future scenes are blended in a complex and visually striking narrative.

By far the most important and influential of the new French directors, however, was the prolific Jean-Luc Godard (q.v.). In his first major film, *Breathless* (1959), he incorporated many of the techniques of the American gangster picture, expressing attitudes drawn from the philosophical movement known as existentialism (q.v.). In such subsequent films as *Masculine-Feminine* (1966) Godard continued to experiment with cinematic techniques. Discarding the rules of conventional filmmaking, he moved the camera freely, encouraged his actors in the free improvisation of their roles, used natural lighting and locales, and developed a rapid, highly varied style of editing. In his increasing freedom from restrictions of plot and formal characterization, Godard covered a wide range of subject matter, from intimate character studies, as in *A Married Woman* (1965), to political and philosophical allegories or essays, as in *La Chinoise* (1967) and *Weekend* (1968).

The impact of these European developments on American filmmakers was heightened by the continued decline of the studio system. In the late 1960's many of the major Hollywood producers closed their facilities or converted them to the production of films for television. The relatively few large-scale films that continued to

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be produced were usually adaptations of successful Broadway musicals or films in which emphasis was placed on violent action and on a frank treatment of sexual relationships. The kind of audience who could see certain types of these films was restricted by a rating system introduced in 1968. The ratings are determined by the Motion Picture Association of America, Inc., a national organization of motion-picture producers and distributors, and put into operation by the members of the National Association of Theater Owners, Inc., an exhibitors' organization.

Among independent filmmakers, however, a notable increase in activity occurred, largely under the stimulus of the work being done in Europe. Subject matter of increasing sophistication and significance became frequent, and directors experimented with a wide variety of cinematic techniques. In other films financed by major companies, such as *Paths of Glory* (1960) and *Dr. Strangelove* (1964), Stanley Kubrick (1928–) dealt with political attitudes, and in his *2001: A Space Odyssey* (1968), he introduced a dazzling variety of light and sound effects. The attitudes of many young people were said to be reflected in *Bonnie and Clyde* (1967) and *Alice's Restaurant* (1969) by Arthur Penn (1922–). Perhaps the most important American film of the late 1960's was the picaresque *Easy Rider* (1969), inexpensively produced and directed by the young actor Dennis Hopper (1936–). Its success alerted the remaining major studios to the apparent necessity of producing films for young people. In addition, a number of so-called "underground" filmmakers, working with simple equipment and nonprofessional actors, made many types of experimental films, often influencing the work of established directors.

As the 1970's began, the motion-picture industry continued on the path toward decentralization and away from the studio-dominated past. Several of the few remaining studios joined together, combining both their real estate and their production and releasing facilities. The two most influential films of the period were independently produced for release by long-established organizations. *The Godfather* (1972), which was to earn more money than any other film in history, was released by Paramount Pictures; *Last Tango in Paris* (1973) was a United Artists release. By the mid-1970's two new film genres had captured the loyalty of audiences: the black film, originally aimed at the Negro filmgoer but gradually attracting a wider public; and the disaster film, in which an interesting group of characters was caught up in a catastro-

phe, such as an earthquake or the sinking of an ocean liner.

A.K. & G.L.C.
MOTION SICKNESS, disorder that afflicts many people in varying degrees when they are subject to swaying motions, yawing, and pitching. The disorder can be experienced on ships (seasickness), in airplanes (airsickness), or even when traveling by automobile (carsickness). It is most likely to occur when motion is induced by rough sea, turbulent air, or curving, up-and-down roads. Different individuals vary in their degree of reaction to motion sickness which in mild cases may produce only minimal nausea and in severe cases causes vomiting, dizziness, unsteady gait, loss of balance, incoordination, and even severe prostration. The disorder occurs because of excessive stimulation of the semicircular canals, a pair of minute organs located within the inner ears. Changes in position are normally recorded in the semicircular canals and transmitted to the brain. Symptoms can be minimized by riding in the center of a moving vehicle, or over the wings of an airplane. A number of drugs, including meclizine (Bonine), cyclizine (Marezine), and dimenhydrinate (Dramamine), when taken before exposure, are often effective in preventing motion sickness, although they may induce drowsiness as a side effect.

L.J.V.
MOTLEY, John Lothrop (1814–77), American historian and diplomat, born in Dorchester (now part of Boston), Mass., and educated at Harvard University. He served briefly as secretary to the United States legation in Saint Petersburg (now Leningrad), Russia, in 1841. After 1847 he devoted himself to research on the history of the Netherlands and wrote *The Rise of the Dutch Republic* (1856), *The History of the United Netherlands* (4 vol., 1860–67), and *The Life and Death of John of Barneveld, Advocate of Holland* (2 vol., 1874). He was minister to Austria (1861–67) and to Great Britain (1869–70).
MOTMOT, any of eight species of solitary tropical birds of the Motmot family, Momotidae, found in South America and Central America. They have colorful green, blue, black, or reddish-brown feathers and a long saw-edged bill. The straight tail shaft of the motmot is usually distinctive for being sheared near the end, resulting in single, racketlike feathers at the tip. Motmots usually live in deep forests, nesting in tree holes or in holes along river banks, and feed on flying insects, reptiles, and fruit. Their name derives from the sound of their call. The common motmot, *Momotus momota*, is 4 in. long, including tail. The largest species, *Baryphthengus ruficapillus*, is up to 20 in. long; the

smallest, *Hylomanes momotula*, about 6 in. long, lacks the odd-shaped tail.

MOTON, Robert Russa (1867–1940), American educator, born in Amelia County, Va., the son of former slaves. He was educated at Hampton Institute (q.v.) and remained at that institution as commandant from his graduation in 1890 until 1915. He was then chosen to succeed the American educator Booker T. Washington (q.v.) as principal of Tuskegee Normal and Industrial Institute, now Tuskegee Institute (q.v.). Although a disciple of Washington, he nevertheless changed the emphasis at the institute from technical training to a more academic curriculum. He resigned from Tuskegee in 1935 because of ill health. Moton was also particularly effective in securing proper recognition for Negro troops during and after World War I (q.v.). See *NEGROES IN THE UNITED STATES: The Negro in World War I*.

MOTORBOAT, any of various types of commercial and pleasure craft propelled by inboard or outboard internal-combustion engines.

History. The development of the internal-combustion engine (q.v.) for marine use began in the United States as early as 1883, and a small gasoline engine suitable for boat propulsion had been designed by 1884. In 1885 the Union Gas Engine Company was incorporated in San Francisco, Calif., for the manufacture of this engine. Many marine-engine manufacturers entered the field during remaining years of the 19th century. Two- and four-cycle engines of from one to eight cylinders and from 1.5 to more than 100 h.p. were developed during the 1890's.

The early experimental motorboats were modeled on the slow, fantail-sterned steam launches of the period. Most of the early engines were relatively heavy for their power. The reduction in comparative weight of engines made possible the use of boats of light displacement, which usually resulted in greater speed.

At the beginning of the 20th century, organized racing began in America and Europe. The early racing motorboats were long and very narrow.

In 1902 *Fairbanks No. 2*, a successful racer with a V-bottom hull, appeared; powered with an engine rated at 12 to 15 h.p., this craft was reputed to have reached a speed of nearly 26 m.p.h. on one occasion. *Fairbanks No. 2* was 37 ft. long and little more than 4 ft. in extreme width. Another example of the extremes reached early in the century was the 1904 lightly-built racing boat *Standard*, a partially decked launch with an overall length of 60 ft., a

waterline length of 58 ft., and a beam of only 7 ft. 6 in.

New Developments. As greater power in light engines became available, racers wider in beam were built. Also developed was the so-called double-wedge hull form, in which the load waterline (the line to which the boat sinks when loaded) was widest at or very near the stern in plan. Racing motorboats were designed with transom, or square-ended, sterns by 1905–06. By 1910, after experiments with full sized boats, a number of surface-skimming craft had been built. The craft, which was named "hydroplane", had a flat or V-bottom hull, sometimes with one or more steps, or breaks, in the bottom fore-and-aft (lengthwise), into which air was forced by tubular vents from above the deck or from side scoops. In 1911, a hydroplane attained a record speed of 45.5 m.p.h. and the hydroplane became the accepted type for motorboat racing. The type was improved rapidly, and eventually it achieved speeds exceeding 100 m.p.h.

Pleasure Cruisers. The development of the motorboat pleasure cruiser, initially a small, low-powered craft, began in the early 1900's. The popular model was originally a boat with a trunk cabin (a cabin that projects above the deck) and large open cockpit. This was succeeded by craft having a cabin under a raised foredeck and with a superstructure containing a pilot-house. V-bottom cruisers won rapid popularity as speed came more and more into demand.

Auxiliary cruisers, combining sail (q.v.) and motor, also became very popular. Most of these craft are primarily sailing yachts with an engine added for limited use; see *SAILING*; *YACHTING*. The demand for greater engine power in this class led to the development of the rarer motor sailer, in which the design is primarily that of a motorboat with sufficient sail area to permit some sailing qualities, and to steady the boat in bad weather. These boats are usually large enough to have commodious deckhouses, as well as below-deck cabins.

Outboard Motor. The development of the outboard motor, was rather slow in the early years of the 20th century. After World War I the popularity of the outboard motor grew steadily, and as a result its power gradually was increased and it was made more reliable. Before long, outboard-motorboat racing was inaugurated. The popularity of the outboard motorboat increased tremendously after World War II, and small cruisers, runabouts, utility boats, and various classes of racers became available. By the mid-

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1950's the outboard motorboat constituted the largest part of the American pleasure-boats fleet. Some of these boats were designed to be carried from place to place on the top of an automobile (q.v.). A more recent development is the trailer, on which outboard racers, cruisers, and other types can be cradled and towed over the roads by automobile. By the late 1960's powerful outboard motors, ranging up to 125 h.p. rating, were available, as was special equipment for handling such engines at the water's edge. The use of two outboard motors on cruisers and runabouts was common in the late 1950's.

Because of the great power available and because the low transom required by this type of motor creates the danger of the boat being swamped, the safety of the outboard motorboat has become a matter of public and governmental concern. The popularity of the outboard motorboat also has produced crowded waters at lake and seaside resorts. In many areas measures have been adopted to prevent accidents caused by excessive speed, careless or reckless operation, and poor boat design.

Fishing Boats. In the U.S. the internal-combustion engine was utilized increasingly in fishing and other commercial small boats during the first quarter of the 20th century, and the motorboat soon replaced nearly all small sail-propelled fishing boats; see **FISHING VESSELS**. The motorboat represents at present the largest investment in boats in the American fishing industry. Some motor fishing craft, such as the New England lobster boats and the Chesapeake Bay crab fishermen, are quite fast, with speeds up to about 20 m.p.h. See also **BOAT**. H.I.C.

MOTORBOAT RACING, sport involving competition between craft powered usually by inboard or outboard internal-combustion engines. The sport comprises two main types of contest, namely the speed race and the so-called predicted-log race. Speed races are for high-powered craft; predicted-log races are contested between relatively slow-moving cabin cruisers, that is, craft equipped with living quarters. Motorboat racing in the United States is supervised by the American Power Boat Association (A.P.B.A.), which was founded in 1903. Commissions within the A.P.B.A. are the inboard, outboard, stock outboard, unlimited-power boat, cruiser, outboard pleasure craft, drag, modified outboard, and offshore commissions. The ruling body of international competition is the Union of International Motorboating, the headquarters of which are in Ostende, Belgium.

Craft Categories. In the U.S., speed-racing craft are assigned to a wide variety of classes on

the basis of such factors as hull form and type and size of engine. Two types of speed-racing hull, or boat frame, exist, namely the runabout and the hydroplane. The runabout is a V-bottom craft useful also for everyday utility boating; when in motion the runabout pushes through the water. The hydroplane has a flat or concave bottom which is molded into a series of steps or is fitted with finlike lateral protrusions known as sponsons or hydrofoils; at high speeds the hull of a hydroplane rises out of the water and is supported largely on its steps or hydrofoils. Because the hydroplane travels over rather than through the water, it is a much faster boat than the runabout, and the two craft seldom compete against each other on equal terms.

Both runabouts and hydroplanes may be propelled by inboard motors, that is, engines located within the hull, or by outboard motors, that is, power plants attached to the stern of the boat, or by inboard engines with outboard drive, known as inboard-outboard (IO) or stern drive engines.

Classes within the inboard and outboard categories are based on the number of cubic inches of air displaced by the pistons of each motor. Piston displacement in the outboard classes ranges from the midget category (under 7½ cu.in.) to the 60-cu.in. class. For competitive purposes a distinction is made between craft powered by specially designed or altered racing engines using methanol or other high-powered fuels and craft powered by so-called stock engines, that is, factory-produced outboard motors using ordinary gasoline.

Piston displacement in the inboard classes ranges from 44 cu.in. to about 450 cu.in. in the 7-liter class. There exists also an unlimited class of inboard hydroplanes comprising the fastest craft afloat; such craft may be powered by internal-combustion or jet engines. The minimum weight was lowered to 4000 lb. in 1969 so that automobile engines could be used.

Types of Races. Speed races are held on lakes and rivers, usually over a closed course marked by buoys; the size and shape of the course vary according to the body of water on which the race takes place. Closed-course races range in distance from 5 mi. for limited outboards to 30 mi. for unlimited hydroplanes. Speed tests for unlimited-class hydroplanes also take the form of races run against the clock over straight, measured-mile courses. In addition, long-distance offshore races, notably the Sam Griffith Memorial, the Bahamas 500, and events off the New York-New Jersey coasts and Long Beach, Calif., are held each year.

In predicted-log racing the various entrants weigh, prior to the contest, such factors as compass courses, tidal currents, and engine speed and estimate the time required to cover the course, as well as the time at which their craft will pass certain buoys or markers along the course. Entrants may not consult timepieces during the race, but each boat carries an observer who records the time of passing buoys or markers. The competitor whose estimates contain the smallest percentage of error is the victor.

Important Records and Competitions. The speeds attained by racing runabouts and hydroplanes vary widely. The measured-mile record for propeller-driven, unlimited hydroplanes, set in 1962 by the American boat *Miss U.S.*, is 200.419 m.p.h.; the record for a jet-propelled, unlimited hydroplane, set by the American craft *Hustler* in 1967, was 285.2127 m.p.h. The record for an outboard hydroplane, set in 1973 by the American boat *Quicksilver* is 136.381 m.p.h. A drag record of 199.11 m.p.h. for $\frac{1}{4}$ mi. was made in 1973 by *Climax*, an inboard motorboat.

Each year about 500 regattas, or competitions, are held in the U.S. and Canada under the auspices of the A.P.B.A. The most famous American race is the annual Gold Cup competition, which dates from 1904; it is open to boats of unlimited horsepower with hulls between 28 and 40 ft. in length. Other notable American races include the President's Cup, the Indiana Governor's Cup, and the Seafair Trophy. An international competition known as the Harmsworth Trophy race was held at irregular intervals between 1903 and 1961. Important races held elsewhere in the world are the Cowes-Torquay in England and the Viareggio-Bastia in Italy.

See also MOTORBOAT; YACHTING: *History*.

MOTORCYCLE, two-wheeled automotive vehicle, resembling a heavy bicycle (q.v.) but having some of the operating features of the automobile. It is powered by an internal-combustion engine (q.v.) using gasoline, has three- to five-speed gearshifts, and usually has a chain drive between the motor and the rear wheel. The engine is started by a foot-activated starter crank. Like most automobiles, motorcycles have brakes of the internal-expanding type, the rear-wheel brake being operated by a foot pedal and the front-wheel brake by a hand lever. The engine is usually air-cooled but a few engines are water-cooled. Other motorcycle features also found on automobiles include a battery, gas tank, and instrument panel; an automatic starter is available on the larger and heavier motorcycles.

An operator's license is required for driving a motorcycle, with provisions and requirements different from those for the automobile license. Most motorcycles accommodate a passenger in addition to the driver, and attachable sidecars supported by one wheel are common. Three-wheeled motorcycles also exist, usually specially built for the handicapped. Vehicles similar to the motorcycle are the motor scooter, which is less powerful and has a foot platform between the front post and the seat, and the so-called moped, essentially a bicycle with a built-in motor that can be started while pedaling the vehicle.

Motorcycles are popular because of their compact size, speed, easy maneuverability, and economy, and have a special appeal to young people. They are widely used by police and military forces around the world. In the United States more than 1000 motorcycle clubs exist, with the American Motorcycle Association as a governing body. Motorcycle racing developed as a sport in the early 20th century and today features both endurance and speed events.

MOTOR, ELECTRIC. See DYNAMOELECTRIC MACHINERY: *Direct-Current (D-C) Motors*; *Alternating-Current (A-C) Motors*.

MOTT, name of two American abolitionists who were husband and wife: **James Mott** (1788–1868) and **Lucretia Coffin Mott** (1793–1880).

James Mott, born in North Hempstead, Long Island, N.Y., was educated at a Quaker boarding school near Poughkeepsie, N.Y., where he later taught. In 1810 he went to Philadelphia, Pa. to work for Lucretia's father; the following year James Mott and Lucretia Coffin Mott were married. Lucretia Mott, born on Nantucket Island, Mass., was also educated at the Quaker boarding school. After 1817 she became prominent in the Society of Friends, and in 1827, when the society split into two factions, she and her husband joined the Hicksites, the liberal faction led by the Quaker minister Elias Hicks (q.v.); see FRIENDS, SOCIETY OF. In 1833 the Motts helped organize the American Antislavery Society (q.v.), and in 1840 they were delegates to an international antislavery convention in London, England. Because of her sex, Lucretia was excluded from the proceedings and she subsequently devoted most of her time and energy to securing equal rights for women. In 1848 with the American suffragette Elizabeth Cady Stanton (q.v.), she organized the Women's Rights Convention in Seneca Falls, N.Y.

Following the passage of the Second Fugitive Slave Law in 1850, the Motts made their home a

MOTT, JOHN RALEIGH

station of the Underground Railroad (q.v.); see also FUGITIVE SLAVE LAWS. James was also instrumental in founding Swarthmore College (q.v.) in 1864. For the rest of her life Lucretia traveled widely, attending meetings and conventions on the rights of women, the promotion of temperance, and the establishment of universal peace. See WOMAN SUFFRAGE.

MOTT, John Raleigh (1865–1955), American evangelist and official of the Young Men's Christian Association (q.v.), known as the Y.M.C.A., born in Livingston Manor, N.Y., and educated at Cornell University. In 1895 he helped organize the World's Student Christian Federation in Sweden and became active in church and missionary movements at home and abroad. From 1915 to 1931 he served as general secretary of the American International Committee of the Y.M.C.A. During World War I he was general secretary of the National War Work Council of the Y.M.C.A., and in 1926 he was named honorary life president of the World's Committee and World's Alliance of Y.M.C.A.'s. During and after World War II he aided prisoners of war and displaced persons in Europe. Mott served as chairman for many years of the International Missionary Council and was active in the World Federation of Churches. In 1948 he became honorary president of the latter organization. He was awarded the 1946 Nobel Peace Prize for his participation in five world church and missionary movements, sharing the award with the American economist and educator Emily Greene Balch (q.v.).

MOTTOLSON, Ben Roy (1926–), American-born Danish nuclear physicist and Nobel laureate.

Mottelson was born in Chicago, Ill., on July 9, 1926, graduated from Purdue University in 1947, and obtained his doctorate in theoretical physics at Harvard University in 1950. Emigrating to Denmark, he entered into a close collaboration with Aage Bohr (q.v.) at the Niels Bohr Institute, Copenhagen, in the study of atomic structure. Pursuing a suggestion by James Rainwater (q.v.), Mottelson and Bohr proved that spinning particles in the outer shell of the atom nucleus may interact with particles deep inside and distort the nucleus into an ellipsoid shape. For this basic discovery, which reconciled the spherical-shell model of the nucleus with observed distortions, Mottelson shared the 1975 Nobel Prize in physics with Bohr and Rainwater.

Since 1957 Mottelson has been a professor at the Nordic Institute of Theoretical Atomic Physics (NORDITA). He became a Danish citizen in 1973.

MOTTO. See HERALDRY: *External Ornaments*.
MOULMEIN, city in Burma, and capital of Tenasserim Division, on the Gulf of Martaban, an arm of the Andaman Sea, about 100 miles s.e. of Rangoon. Lying on the Salween R. 28 mi. from the sea, it is at the confluence of the Ataran and Gyang rivers and has ferry service to Martaban; from there a railroad connects to Pegu. Moulmein is a road hub and the terminus of a railroad leading south to Ye. It is also a port, shipping chiefly teak and rice. Industries include sawmilling, rice milling, shipbuilding, brewing, and the manufacture of gold and silver handicrafts. Rubber plantations are extensive to the s. of the city. Many noted pagodas and caves are in the city and on surrounding ridges, and bathing resorts are nearby. Moulmein was the chief town of British Burma from 1827 to 1852. The name was formerly spelled Maulmain and is Mawlamyaing in Burmese. Pop. (1970 est.) 172,569.

MOULTRIE, William (1731–1805), American soldier, born in Charleston, S.C. On the outbreak of the American Revolution, he was appointed colonel of a South Carolina regiment. He raised the first American battleflag on Fort Johnson, James Island (1775). His most notable feat was the construction, on Sullivan's Island in Charleston harbor, of a palmetto fort, afterward called Fort Moultrie, which he defended successfully against the attack of the British admiral Sir Peter Parker (1721–1811). Appointed brigadier general, he commanded in Georgia and South Carolina. Captured at the fall of Charleston, he was exchanged in 1782, and the same year promoted to major general. He was afterward elected governor of South Carolina for two periods (1785–87, 1792–94).

MOUND BIRD. See BIRD: *Habits*; EGG.

MOUND BUILDERS, hypothetical race of people at one time supposed to have built numerous mounds found particularly in the Ohio and Mississippi river valleys. They were thought to antedate the American Indians. Archeological research in the late 19th century clearly demonstrated that the people who built these mounds lived at various periods of time and were the ancestors of the American Indians found by Europeans in the same regions. Nevertheless, the myth of pre-Indian Mound Builders still persists. In fact, mounds have been built by many different peoples throughout the world; see DOLMEN. Those in eastern North America served a variety of purposes. Some, known as midden mounds, resulted from hundreds of years of habitation and the accretion of garbage and other residential debris; these are probably earlier than 1000

B.C. Other mounds were built as monuments to deceased persons buried within. These burial mounds, dating from 500 B.C. and later, often had a central chamber, made of logs, that contained the remains of one or more notable personages. Yet other burial mounds were cemetery areas for less important people. After 700 A.D., particularly in the upper Midwest, many mounds were built in the form of animal effigies. Platform mounds, originally constructed as bases upon which important public buildings, houses of leaders, temples, and charnel houses were situated, date from the period after 800 A.D. Spaced around a plaza, they formed the central portions of important communities. Such mounds were being built by various Indian groups at the time of European contact with eastern North America. Indeed, the early French settlers witnessed the use of mounds for public buildings and burials by the Natchez Indians of Louisiana. The practice of building mounds ceased shortly after European contact, as Indian cultures disintegrated under the impact of epidemics and cultural change.

See also AMERICAN INDIANS; EAST SAINT LOUIS. **MOUND CITY GROUP NATIONAL MONUMENT**, area in south-central Ohio containing prehistoric burial mounds of the Mound Builders (q.v.). See NATIONAL PARK SERVICE.

MOUNDOU, town in Chad, and capital of Logone Occidental Prefecture, on the Western Logone R., 260 miles S.E. of Fort-Lamy. The cultural and trade center of the Sara peoples, it is a road junction and on the route of a railroad to be built from Yaoundé, Cameroon, to Fort-Archambault. The center of a large cotton- and rice-producing area, the town also has brewing and fishing industries. It is the seat of a teachers' college. Until 1946 Moundou was part of the French Ubangi-Shari territory, now the Central African Republic. Pop. (1972 est.) 39,600.

MOUNDSVILLE, city in West Virginia, and county seat of Marshall Co., on the Ohio R., about 10 miles S. of Wheeling. It is in a coal-mining area, and has manufactures of glass, enamelware, chemicals, and toys. At Moundsville is a large Indian burial mound of the Mound Builders (q.v.). The city was settled in 1771, and incorporated in 1865. Pop. (1970) 13,560.

MOUNT, William Sidney (1807-68), American painter, born in Setauket, Long Island, N.Y. He studied at the National Academy of Design, New York City, and was made a full academician in 1832. He painted portraits of several prominent Americans, including Daniel Webster (q.v.), statesman and orator, and produced

many skillful genre pictures. Examples of his work are in the Corcoran Art Gallery, Washington, D.C., and the Metropolitan Museum of Art, New York City.

MOUNTAIN CLIMBING or **ALPINISM**, sport dating in its modern form from about 1850, when British sportsmen began systematic climbing in the Alps. Climbing was at first restricted to men, aided by professional guides, but in later years women entered the field, and more and more climbers worked without guides. By the end of the 19th century American climbers had achieved fame for their exploits in the Andes and Alaskan Rockies. The most famous of the early ascents were in the Alps and included Mont Blanc, 15,771 ft. above sea level (1786); Jungfrau, 13,642 ft. (1911); and Matterhorn, 14,688 ft. (1865). American parties reached the summit of the highest peak in China, Minya Konka, 24,902 ft., in 1932. In the Himalaya, a French party attained the summit of Annapurna, 26,504 ft., in 1950, and an Austrian climber reached the peak of Nanga Parbat, 26,660 ft., in 1953.

Mount Everest, with an altitude of 29,028 ft., has always represented the supreme challenge to mountaineers. In 1953 a party composed of British and Nepalese climbers achieved the summit of Everest, the highest peak on the surface of the earth. In 1973 Mt. Everest was first conquered in the dangerous autumn season by a forty-eight-man Japanese expedition. The summit of the second-highest mountain in the world, Mt. Godwin Austen, 28,250 ft., was attained in 1954 by Italian climbers, and that of the third-highest mountain, Kanchenjunga, 28,208 ft., in 1955 by a British expedition.

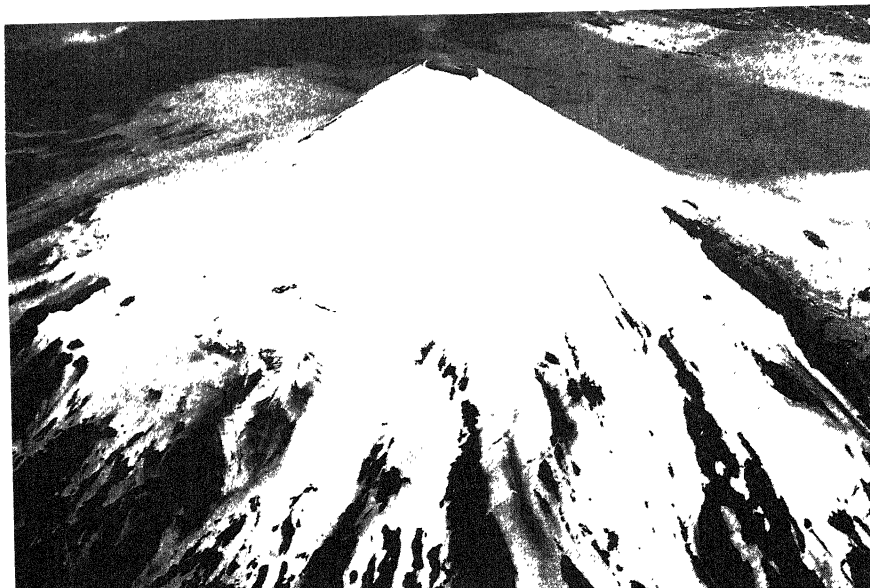
More than 250,000 persons are enrolled in the various Alpine societies in Europe. In the United States, climbing societies include the Appalachian Mountain Club, in Boston (founded in 1876), the Sierra Club, in San Francisco (1892), the Mazamas in Portland, Ore. (1894), the Mountaineers Club (1912), and the Alpine Club of Canada (1906).

MOUNTAIN GOAT. See ROCKY MOUNTAIN GOAT.

MOUNTAIN LAUREL. See KALMIA.

MOUNTAIN LION. See PUMA.

MOUNTAINS, name usually applied to any region of land that is raised rather steeply above the surrounding terrain. They are distinguishable from plateaus by their usually limited summit area; and they are distinguishable from what are commonly called hills by their generally higher elevation. Mountains are normally found in groups or ranges consisting of peaks, ridges,



The snow-covered Villarrica volcano in the Andes Mts. of Chile, about 400 miles south of Santiago. UPI

and intermontane valleys. Apart from certain mountains which occur singly, the smallest unit is the range, comprising either a single complex ridge or a series of ridges generally alike in origin, age, and form. Several closely related ranges in a parallel alignment or chainlike cluster are known as a mountain system; an elongated series of systems forms a mountain chain; and an extensive complex of ranges, systems, and chains is known as a belt or cordillera.

Formation. Mountains primarily are formed in three ways: (1) by crustal uplift, that is, folding, faulting, or arching of the earth's crust; (2) through differential erosion or land sculpturing; (3) by volcanic action.

UPLIFT. Most mountains form when portions of the crust of the earth are uplifted through one of several geologic processes. One common cause of uplift is horizontal crustal compression, which results in a local shortening and accompanying deformation of the crust into folds or wrinkles. Such folds are anticlinal, composed of layers of stratified rock inclining downward in opposite directions from the axis of the fold, or synclinal, forming a trough of stratified rock in which the layers are bent toward each other from either side. The Alps and the Jura in Europe, and the Appalachian mountains and most of the Rocky mountains (qq.v.) in the United States are examples of mountain systems formed by crustal folding.

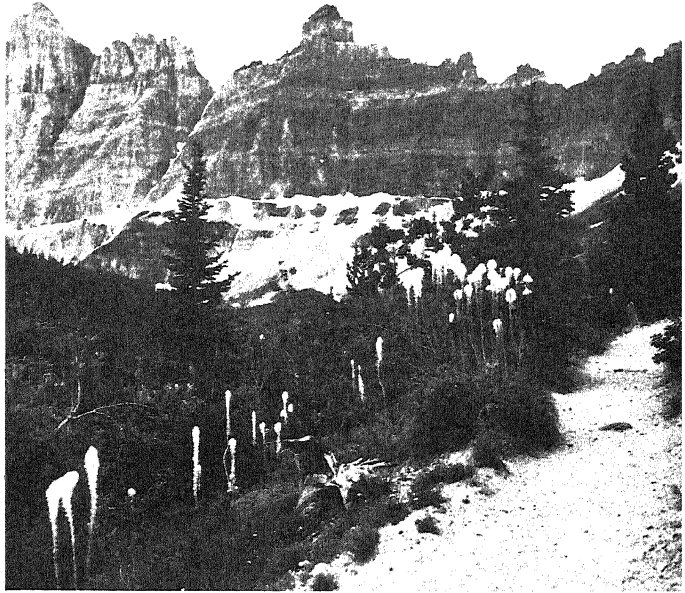
Another type of mountain created by uplifting of the earth's crust is known as the basin range structure. Formation of this type, best exemplified by the basin ranges in Nevada and Arizona (see GREAT BASIN), is the result of differential movement of rock along faults, or major deep cracks, in the crust of the earth. Occasionally, such movement, or so-called faulting, causes rock bordering on faults to be uplifted vertically in great blocks. Often these are tilted, because the uplift occurs mostly on one side of the fault; the raised edges of the blocks then appear as mountains, the depressed edges as valleys. Such mountains are also widely known as fault-block or block mountains.

A third type of mountain formed by uplift is the so-called dome. It is typified by the Henry and Abajo mountains in Utah, and by the Adirondack mountains (q.v.) in New York, and is created by deep-seated intrusion of igneous, or molten, rock which arches the rocks at the surface.

Recent deep-sea and dry-land drilling projects have produced enough evidence to enable geologists to develop a so-called plate-tectonics model, which has gone a long way toward explaining diverse geological and geophysical processes involved in mountain building and continental drift; see CONTINENT; GEOPHYSICS. Briefly, the plate-tectonics concept envisions the crust of the earth as made up of several vast plates that move about, at the rate of a few centimeters a year, leading to collision and separation of

A trail lined with ghost-like bear grass in the Rocky Mts. of Glacier National Park in Montana. The mountains in the background are an example of horizontal erosion.

UPI



continents and the development of mountain belts.

EROSION. Rock exposed on the surface of the earth is constantly being eroded away. Because rocks of different composition resist erosion differently, however, areas of relatively hard rock may stand high above areas of softer, more easily eroded rock. Mountains thus resulting from this erosive sculpturing of the land may be linear in appearance, if the resistant rock is the upturned edge of a sedimentary rock unit; flat-topped buttes or mesas, if the harder rock is a flat-lying unit; or complex and irregular ranges, if the resistant rocks are an uncovered intrusive igneous mass. Portions of the Ozark Plateau in Arkansas and Missouri are good examples of mountains created by the forces of erosion; see OZARK MOUNTAINS.

VOLCANISM. Mountains formed by volcanic action are well known because of their usually isolated occurrence and periodically dangerous aspect. Most spectacular and probably most familiar are the conical peaks composed of lava and volcanic debris, such as Mt. Rainier and Mt. Hood in the U.S., Vesuvius in Italy, and Fuji (q.v.) in Japan. Many of these volcanic mountains have summit craters that still emit steam and debris; others no longer showing signs of volcanic activity may be only dormant, not extinct. Shield volcanoes, typified by Mauna Loa and Mauna Kea (q.v.) in Hawaii, are less spectacular even when quite high, since the physical properties of their formative material have

shaped them into broad, shieldlike masses that deemphasize their height.

Importance. Mountains affect life in many ways. Apart from their obvious mineral, forest, agricultural, and recreational resource value, they exert a significant influence on climate and determine the course of economic or historical trends. Especially high mountains, such as the Sierra Nevada in the U.S., the Andes in South America, and the Himalaya in Asia markedly affect climate and weather patterns over vast areas of the earth because they stand as barriers to regularly circulating air masses. Moisture carried inland by winds from the Pacific Ocean, for example, is lost in the form of rain and snow on the windward sides of the Sierra Nevada and Andes; the leeward, or inland, side is drier, while the land beyond is often arid.

The importance of mountains with regard to the history and economies of various nations can be shown by their influence upon the development of the western U.S. The first travelers and settlers, and then the earliest railroads, avoided mountain crossings because of the dangers and costs involved. Later, on the other hand, the vast deposits of minerals which became so vitally important to the development of several western States were found chiefly exposed in mountainous areas, and the lure of "striking it rich" drew people and railroads westward despite the hardships encountered in traversing the passes. As a result, transportation routes and patterns, with large populations cen-



Mountains afford some of the most spectacular views to be seen on earth, as exemplified in this view from Schynige Platte on Lake of Thun, Switzerland. The Alps were formed by a process of crustal folding.

Swiss National Tourist Office

tered about then, were established; most of these remain today.

The political significance of mountains has been noticeable throughout human history. Mountain barriers with their relatively narrow and easily defendable passes have made various ranges throughout the world natural political boundaries second in strategic importance only to oceans and seas. See *EARTH: Age of the Earth*; *EROSION*; *GEOLOGY*; *VOLCANISM*. For a list of principal mountains of the world, see *WORLD ATLAS AND GAZETTEER* in Vol. 1.

MOUNTAIN, THE, in the French Revolution (q.v.), name applied to the party of extreme radicals led by Maximilien de Robespierre and Georges Jacques Danton (qq.v.). The name was derived from the fact that the representatives of the party, known as *Montagnards*, seated themselves in the highest part of the hall in which the National Convention was meeting.

MOUNTAIN VIEW, city of California, in Santa Clara Co., near the E. base of the Santa Clara Mts., about 5 miles S.E. of Palo Alto. Industries include printing and the manufacture of electric and electronic equipment and chemicals. The city is the seat of aeronautical and nuclear research laboratories and of Saint Joseph's College (Roman Catholic; men), affiliated with Saint Patrick's College (1898) in Menlo Park. Mountain View was formed by the merger of two small localities in 1864; it was incorporated in 1902. Pop. (1960) 30,889; (1970) 51,092.

MOUNTBATTEN, Louis, 1st Earl Mountbatten

of Burma (1900-79), British naval officer, the son of Prince Louis Alexander of Battenberg (1854-1921), and great grandson of Queen Victoria (q.v.), born in Windsor, England, and educated at Osborne and Dartmouth Royal Navy colleges and at Christ's College, University of Cambridge. Because of anti-German sentiment, his father anglicized the family name to Mountbatten in 1917. Louis entered the Royal Navy as a cadet in 1913 and held a number of successively higher ranks. In 1942, during World War II, he became chief of British commando (q.v.) operations. The following year he was made supreme Allied commander in Southeast Asia. In March, 1947, Mountbatten was created an earl and became both the viceroy of India and governor-general of the new Dominion of India. He returned to England in June, 1948, and later served as the Mediterranean commander of the North Atlantic Treaty Organization (1952-54) and first sea lord (1955-59); he was promoted to admiral of the fleet in 1956.

On August 27, 1979, Mountbatten was killed when a bomb, planted by terrorists of the Irish Republican Army, blew up his fishing boat in Donegal Bay, off the coast of northwestern Ireland.

MOUNT CLEMENS, city in Michigan, and county seat of Macomb Co., on the Clinton R., near Lake Saint Clair, 20 miles N.E. of Detroit. The city is an important trading center and a leading health resort known for its nearby mineral springs. Among the industrial establishments in Mount Clemens are greenhouses, boatyards, pottery works, and factories manufacturing

plastics and a variety of metal products. Near the city is Selfridge Air Force Base. Mount Clemens was settled about 1802, incorporated as a village in 1837, and chartered as a city in 1879. Pop. (1960) 21,016; (1970) 20,476.

MOUNT DESERT, island in the Atlantic Ocean, in Hancock Co., Maine. It is located in Frenchman Bay, 40 mi. s.e. of Bangor, and covers an area of about 100 sq.mi. The best-known summer resorts are Bar Harbor, North-East Harbor, and Bass Harbor. The island forms the major portion of Acadia National Park (q.v.).

MOUNT EVEREST. See EVEREST, MOUNT.

MOUNT HOLYOKE COLLEGE, nondenominational privately controlled institution of higher learning for women, situated in South Hadley, Mass., and founded in 1837 by the American educator Mary Lyon (q.v.) as Mount Holyoke Female Seminary. The college was known as Mount Holyoke Seminary and College from 1888 to 1893; the present name was adopted in the latter year. Mount Holyoke College is well known for the high academic standards required of the students. It offers undergraduate courses in the liberal arts leading to the bachelor of arts degree, graduate courses leading to the degree of master, and a joint doctor of philosophy program. Graduates of Mount Holyoke are eligible for special fellowships at the American School of Classical Studies in Athens, Greece, and at a similar institution in Rome, Italy. In 1973 the college libraries housed 360,000 bound volumes. In the same year enrollment totaled 1880 undergraduate and graduate students, the faculty numbered about 200, and the endowment was \$44,000,000.

MOUNT LEBANON, township of Pennsylvania, in Allegheny Co., 5 miles s.w. of downtown Pittsburgh, of which it is a suburb. Manufactures include electronic equipment and textile products. The area was settled in the 1770's. Pop. (1960) 35,361; (1970) 39,596.

MOUNT OF OLIVES. See OLIVES, MOUNT OF.

MOUNT PALOMAR OBSERVATORY. See PALOMAR OBSERVATORY.

MOUNT PLEASANT, city in Michigan, and county seat of Isabella Co., on the Chippewa R., about 27 miles w. of Midland. The city began to grow after oil was found nearby in 1928, and it now is an oil refiner and supplier. Mount Pleasant has varied manufacturing, which includes flour, gasoline, and automobile parts. It is the site of Central Michigan University, founded in 1892. The city was incorporated in 1889. Pop. (1960) 14,875; (1970) 20,504.

MOUNT PROSPECT, village of Illinois, in Cook Co., 20 miles n.w. of Chicago and 12 miles

w. of Evanston. Lying in a dairying, truck-farming, and grain-growing area, the village manufactures business machines, scientific and optical equipment, wire, and metal products. Settled about 1860, the village was incorporated in 1917. Pop. (1970) 34,995.

MOUNT RAINIER NATIONAL PARK, area of natural interest in west-central Washington, containing Mt. Rainier, 14,410 ft. above sea level, fourth-highest mountain in the continental United States. The peak, an ice-clad volcano, is located on the w. edge of the Cascade Mt. crestline, about 56 mi. s.e. of Tacoma. The park covers an area of 241,992 acres, of which approximately one fourth is occupied by Mt. Rainier, from which radiates one of the largest single-peak glacial systems in the world. Twenty-six active glaciers extend down the sides of the mountain and cover an area of about 40 sq.mi. Five of the glaciers, the Emmons, Nisqually, Ingraham, Winthrop, and Tahoma glaciers, originate at the summit, and seven other major glaciers arise in large cirques at elevations of about 10,000 ft. above sea level. The fauna in the park includes the bear, deer, raccoon, mountain lion, bobcat, and coyote, and the flora includes numerous varieties of wild flowers, in addition to forests of hemlock, cedar, fir, and pine, which cover the sides of the mountain to an elevation of about 4500 ft. Mount Rainier was named after Admiral Peter Rainier (1741?-1808), of the British navy, by the English navigator and explorer George Vancouver (q.v.), in 1792. The first successful ascent to its summit was made in 1870. The park is administered by the National Park Service (q.v.).

MOUNT RUSHMORE NATIONAL MEMORIAL, region in the Black Hills of South Dakota consisting of a group of colossal portraits in granite of Presidents George Washington, Thomas Jefferson, Abraham Lincoln, and Theodore Roosevelt (qq.v.). The massive portraits, varying between 50 and 70 ft. high, were carved in the side of Mt. Rushmore by the American sculptor Gutzon Borglum (see under BORGLUM). The project was authorized in 1925 by Congress, which chose Borglum as sculptor. Covering 1278.45 acres, the memorial is administered by the National Park Service (q.v.).

MOUNT VERNON, home of George Washington (q.v.), later, the first President of the United States, in Fairfax County, Va., on the Potomac R., 15 miles s. of Washington, D.C. The Washington mansion, beautifully situated on a hill, is a three-story building of wood. It was built in 1743 by Washington's half brother Lawrence (d. 1752), who called it Mount Vernon

MOUNT VERNON

after Admiral Edward Vernon (1684–1757), under whom Lawrence had served in the British navy. George Washington inherited Mount Vernon in 1752. Both he and Martha Washington (1732–1802), his wife, are buried in an ivy-covered mausoleum a few hundred yards from the house. The Mount Vernon Ladies' Association acquired the mansion in 1860 and maintains it as a place of national interest.

MOUNT VERNON, city in Illinois, and county seat of Jefferson Co., about 63 miles s.e. of Belleville. Manufactures include electrical equipment, clothing, and household appliances. It is the site of Mount Vernon Community College, founded in 1955. Pop. (1960) 15,566; (1970) 15,980.

MOUNT VERNON, city in New York, in Westchester Co., just n. of New York City of which it is a residential and industrial suburb. It has manufactures of electrical equipment and components, machinery, clothing, cosmetics, and medical supplies. The city was settled in 1664, and incorporated in 1892. Pop. (1960) 76,010; (1970) 72,778.

MOUNT WASHINGTON. See WASHINGTON, MOUNT.

MOUNT WILSON OBSERVATORY, astronomical observatory located on 5710-ft.-high Mt. Wilson, near Pasadena, Calif. See ASTRONOMY. It is owned by the Carnegie Institution of Washington (q.v.) and is operated with the Palomar Observatory (q.v.) as a unified research organization. The observatory was established in 1904 exclusively for the study of the sun (q.v.). In 1908, upon completion of the 60-in. reflecting telescope, then the largest in the world, studies of stars, nebulae, and galaxies were also undertaken. In 1918 a 100-in. telescope was completed, the largest in the world until the completion in 1949 of the 200-in. Hale telescope at Palomar Observatory. With the 100-in. telescope astronomers made the fundamental dis-

covery that distant spiral-shaped formations in the sky were other galaxies; later it was found that they were moving away from the earth with speeds proportional to their distances. Three solar telescopes at the observatory make detailed studies of the sun during daylight hours. In 1970, Mount Wilson and Palomar together took the name Hale Observatories, after the astronomer George Ellery Hale (q.v.). See also TELESCOPE.

MOUSE, common name for any small rodent in the family Muridae; large species of this family are known as rats; see RAT. Mice are extremely numerous throughout most of the world, and are economically important because they are voracious and usually omnivorous. Fields and human habitations serve equally well as homes for these creatures. Mice, like rats, spread numerous diseases and may be eradicated by methods similar to those used for eradication of rats.

The common house mouse, *Mus musculus*, is the most frequently observed species, and is the ancestor of the white mice that are raised for scientific experimentation. In its wild state the house mouse is slightly less than 6½ in. long including the tail, which is slightly more than 3 in. long; domestic mice, because of better nutrition, are often considerably larger. The house mouse is yellowish gray above, sometimes streaked with black, and lighter gray beneath. It breeds every ten to seventeen weeks throughout the year, producing five to ten young in a litter.

The common American wood mice belong to the genus *Peromyscus*. The white-footed mouse, or deer mouse, *P. maniculatus*, slightly larger than the house mouse, is a common American outdoor mouse. Prevalent in the southern United States is the cotton mouse, *P. gossypinus*. Dark brown with grayish feet, it is injurious to cotton plants. The grasshopper mice



Common house mouse,
Mus musculus

Tom McHugh -
National Audubon Society

or scorpion mice, constituting the genus *Onychomys*, inhabit western North America and differ from typical mice in feeding chiefly on insects and other arthropods. The common wood mouse of Europe is *Apodemus sylvaticus*. Harvest mice are common in America (*Reithrodontomys*) and Europe (*Micromys*). The so-called field mouse or meadow mouse is not classed as a mouse but as a vole (q.v.). The lemming mouse is intermediate in characteristics between the lemming (q.v.) and the vole. The name mouse is applied also to the pocket mouse (q.v.), belonging to an entirely different family from the species mentioned above.

MOUSSORGSKY, Modest Petrovich. See MOURSOGSKI, MODEST PETROVICH.

MOUTH, opening into the body of most animals, through which food is ingested, and often the outlet of sound or voice communication. In many of the protozoans, such as the amoeba, no permanent orifice is present; such animals ingest food by wrapping themselves around it, encircling the edible object with their fluid protoplasm (q.v.). Other protozoans, such as the paramecium, have well-marked openings into which their food is swept. The structure of the mouth in organisms becomes more complex as the alimentary tract develops. In coelenterates, the mouth, which is terminal, leads directly into the tubular body cavity. In mollusks the mouth is generally anterior; in cephalopods, such as the squids, the mouth is in the center of the foot, and is surrounded by horny plates similar to the beak of a parrot. Insects have special anterior mouth parts, which may be adapted for biting, chewing, piercing, or sucking.

Virtually none of the invertebrates have need for oral digestion (q.v.); the mouth of invertebrates, therefore, is little more than a slit. In the vertebrates, however, food is usually retained just within the aperture before passing into the remainder of the alimentary canal, and consequently the term mouth in vertebrates refers to both the orifice and the region of the head just within the orifice. The most primitive vertebrate mouth is that of the Cyclostomata, which have habitually open, rounded mouths. In all the vertebrates other than the cyclostomes, the mouth is bounded by movable jaws, which allow the aperture to be opened or closed. Vertebrate mouths are characterized by lips, or fleshy folds, making up the region about the aperture, and by teeth (q.v.) and a tongue (q.v.) within the mouth cavity. See separate articles on animals and biological classifications mentioned above.

The Mouth of Man. In man two cavities, the buccal cavity, between the lips and cheeks on

the outside, and the front of the teeth and the gums inside; and the oral cavity, between the teeth and the pharynx, make up the mouth. The buccal cavity merges with the oral cavity at the sides of the jaws. The parotid salivary gland opens into the buccal cavity; other salivary glands (q.v.) open into the oral cavity. The roof of the oral cavity is made up of the bony, hard palate in the front portion, and of the fibrous, soft palate in the rear, that ends at the pharynx in several loose, membranous folds. The floor of the oral cavity is occupied by the tongue.

MOZAMBIQUE, republic of S.E. Africa, bordered on the N. by Tanzania, on the E. by the Mozambique Channel of the Indian Ocean, on the S. by South Africa and Swaziland, and on the W. by Rhodesia (Zimbabwe), Zambia, and Malawi. Its area is about 302,330 sq.mi.

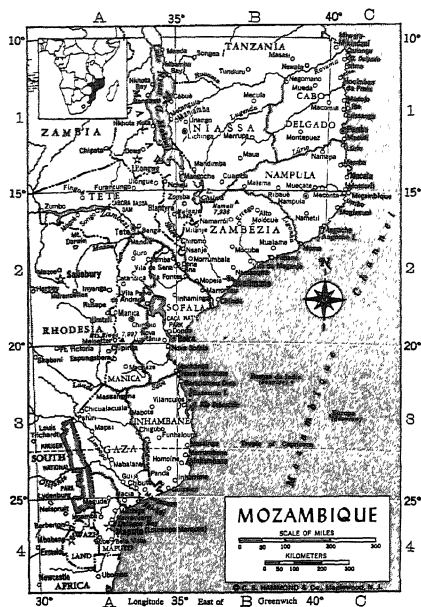
The terrain of Mozambique is broadly divisible into coastal lowlands, widest in the S.; scattered plateaus of medium and high altitude; and small mountain ranges, located principally in the W. and N.W. The loftiest point is Mt. Binga (7992 ft. high), in the W. The country's main rivers are the Limpopo, Zambezi (qq.v.), Rovuma, and Save. The climate is generally tropical or subtropical, and rainfall is seasonal.

Mozambique has relatively little fertile soil; the best farmland is situated in the river valleys and in patches near the coast. About one fourth of the country is covered with woodland; valuable hardwoods such as ebony and mahogany abound, as do coconut and date palms. There are numerous wild animals, including lions, elephants, rhinoceroses, leopards, and zebras.

According to the 1970 official census, Mozambique had 8,233,978 inhabitants; the United Nations estimated the population at 9,680,000 in 1977. Almost all of the people are black Africans who speak a Bantu (q.v.) language. There are several distinct ethnic groups, notably the Makonde, Makua, Maravi, Shona, Tonga, and Yao. The country's capital and largest city is Maputo (see LOURENÇO MARQUES); other urban centers include Beira, Nampula, and Tete (qq.v.). The nation is divided into ten provinces. Most Mozambicans follow traditional religious beliefs, but there also are sizable Christian and Muslim communities. There is a small but growing school system; a university is at Maputo.

In the mid-1970's the economy of Mozambique was overwhelmingly agricultural. The chief crops were cassava, maize, rice, plantains, sugarcane, cashew nuts, tea, cotton, and sisal. Large numbers of poultry, cattle, goats, and hogs were raised. Fishing and mining were relatively undeveloped, but the country was estimated to

MOZAMBIQUE



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Fingoe	A 1	Quelimane	A 2
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Honohine	A 3	Quelimane	A 2
Inhamitanga	B 3	Quelimane	A 2
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Lumbo	C 2	Quelimane	A 2
Lurio	C 1	Quelimane	A 2
Manica	A 3	Quelimane	A 2
Manica	B 1	Quelimane	A 2
Manica	A 2	Quelimane	A 2
Manica	A 4	Quelimane	A 2
Maputo (cap.)	B 2	Quelimane	A 2
Marcene	B 2	Quelimane	A 2
Maringa	B 3	Quelimane	A 2
Maua	B 2	Quelimane	A 2
Maua	B 2	Quelimane	A 2

have major untapped deposits of iron ore, natural gas, beryl, and tantalite. The principal manufactures of Mozambique were food products, refined petroleum, textiles, and cement. The Cahora Bassa Dam, a large hydroelectric project on the Zambezi, was being completed in the late 1970's. The nation's transportation facilities included major ports at Maputo and Beira; railroads running inland from Maputo, Beira, and Mozambique; about 16,520 mi. of roads; and an international airport at Maputo. The country's currency is the escudo, divided into 100 centavos (33.4 escudos equal U.S.\$1; 1977). In the mid-1970's the nation's exports earned about \$202,000,000 per year, and its imports cost \$417,000,000 annually.

Mozambique is governed under a constitution adopted in 1975. The nation's head of state and chief government official is the president, who is chosen by Frelimo, the only legal political party. The national legislature is the People's Assembly, with a maximum of 210 members.

History. The area of Mozambique was settled by Bantu-speaking black Africans before 1000 A.D., when Arab and Swahili (q.v.) traders began to establish settlements along the coast. Sofala, near present-day Beira, soon became an important center for exporting gold and ivory from the interior. In 1498 the Portuguese navigator Vasco da Gama (q.v.) visited the coast, and by the mid-16th century Portugal controlled some coastal towns and parts of the interior. Mozambique was governed by the Portuguese as part of Goa, in India, until 1752, when it became a separate dependency. The presence of Portugal was minimal until 1895-1920, when its agents established authority over most of the indigenous people and several European agricultural colonies were founded. In 1964 Frelimo, a nationalist alliance, initiated a guerrilla campaign for independence, and after considerable fighting Mozambique became independent on June 25, 1975. Under Samora M. Machel (1933-), the first president, much of the country's economy was nationalized during 1975-77.

MOZAMBIQUE CHANNEL, arm of the Indian Ocean, separating the island of Madagascar from Mozambique, in S.E. Africa. It is about 925 mi. long and up to 625 mi. wide.

MOZART, Wolfgang Amadeus, baptized as JOHANNES CHRYSOSTOMUS WOLFGANGUS THEOPHILUS MOZART (1756-91), Austrian composer, born in Salzburg. Mozart was educated by his father Leopold Mozart (1719-87) who was a concertmaster in the court orchestra of the archbishop of Salzburg and a celebrated violinist, composer, and author.

Mozart's Musically Precocious Childhood.

Five short piano pieces composed by Mozart at the age of six are still frequently played. In 1762 Leopold took Wolfgang on the first of many successful concert tours through the courts of Europe. At this time Mozart became an accomplished performer on the clavichord, violin, and organ, and highly skilled in sight reading and improvisation. During this period he composed sonatas for the harpsichord and violin (1763), a symphony (1764), an oratorio (1766), and the *opera buffa*, *La Finta Semplice* ("The Simple Pretense", 1768). In 1769 Mozart was appointed concertmaster to the archbishop of Salzburg, and later in the same year, at La Scala, Milan, Italy, he was made a chevalier of the Order of the Golden Spur by the pope. At the age of fourteen he was commissioned to write a serious opera. This work, *Mitridate, Rè di Ponto* ("Mithridates, King of Pontus", 1770), produced under his direction at Milan, completely established an already phenomenal reputation.

The Mozarts returned to Salzburg in 1771. Hieronymus, Count von Colloredo, the successor to the archbishop of Salzburg, who died while the Mozarts were touring Italy, cared little for music. Mozart's appointment at Salzburg, however, proved to be largely honorary; it allowed ample time for a prodigious musical output during his next six years, but afforded little financial security. In 1777 Mozart obtained a leave of absence for a concert tour and left with his mother for Munich.

A Difficult Later Life. The courts of Europe ignored the twenty-one-year-old composer in his search for a more congenial and rewarding appointment. He traveled to Mannheim, then the musical center of Europe because of its famous orchestra, in hopes of a post, and there fell in love with Aloysia Weber. Leopold promptly ordered his son and wife to Paris. His mother's death in Paris in July, 1778, his rejection by Aloysia, and the neglect he suffered from the aristocrats whom he courted, made the two years from Mozart's arrival in Paris until his return to Salzburg in 1779 one of the most difficult periods in his life.

While at home Mozart composed two masses and a number of sonatas, symphonies, and concertos; these works reveal for the first time a distinctive style and a completely mature understanding of musical media. The success of Mozart's Italian *opera seria*, *Idomeneo, Rè di Creta* ("Idomeneo, King of Crete"), commissioned and composed in 1781, prompted the archbishop of Salzburg to invite Mozart to his palace at Vienna. A series of court intrigues and his ex-

ploitation at the hands of the court soon forced Mozart to leave. In a house in Vienna rented for him by friends, he hoped to sustain himself by teaching. During this period Mozart composed a *Singspiel* (a type of German operetta with some spoken dialogue) called *Die Entführung aus dem Serail* ("The Abduction from the Seraglio"), which was requested by Joseph II Holy Roman Emperor (see under JOSEPH) in 1782; the originality of this work had a revolutionary effect upon the growth of the *Singspiel* form.



Wolfgang Amadeus Mozart playing the spinet, accompanied by his father and his sister.

In the same year Mozart married Constanze Weber (1763–1842), Aloysia's younger sister. Unending poverty and illness harassed the family until Mozart's death. *Le Nozze di Figaro* ("The Marriage of Figaro", 1786) and *Don Giovanni* ("Don Juan", 1787), with librettos by the Abbé Lorenzo da Ponte (q.v.), while successful in Prague, were partial failures in Vienna. From 1787 until the production of *Così fan Tutte* (1790, again with a libretto by Da Ponte), Mozart received no commissions for operas. His three great symphonies of 1788 were never performed under his direction. While Mozart was working on the German opera, *Die Zauberflöte* ("The Magic Flute", 1791), an emissary of a Count Walsegg mysteriously requested a Requiem Mass. This work, uncompleted at his death, proved to be Mozart's last musical effort. He died of typhoid fever in Vienna on Dec. 5, 1791; his burial was attended by few friends and the place of his grave is unmarked.

Evaluation. Mozart had an unsuccessful career and died young, but he ranks as one of the great geniuses of Western civilization. His large output (more than 600 works) shows that even as a child he possessed a thorough command of the technical resources of musical composition and an original imagination. His instrumental works include symphonies, divertimenti, sonatas, chamber music for a number of instrumental combinations, and concertos; his vocal works consist mainly of church music and operas. Mozart's creative method was extraordinary, for his manuscripts show that, though he made an occasional preliminary sketch of a difficult passage, he almost invariably thought out a complete work before committing it to paper. His music combines an Italian taste for clear and graceful melody with a German taste for formal and contrapuntal ingenuity. Mozart thus epitomizes the goal of classicism in music, which is to be succinct, clear, and well balanced while at the same time developing ideas to a point of emotionally satisfying fullness. These qualities are perhaps best expressed in his concertos, with their dramatic contrasts between a solo instrument and the orchestra, and in his operas, with their dramatic contrasts between different personalities reacting to changing situations. His operas achieved a new unity of vocal and instrumental writing; they are marked by subtle characterization and an unusual use of classic symphonic style in large-scale ensembles.

MUAWIYAH I. See CALIPH: *The Immediate Successors; The Umayyad Caliphs (661–750).*

MUCILAGE. See GLUE; GUM

MUCKRAKING. See JOURNALISM: *The Growth of Editorialization; STEFFENS, LINCOLN*

MUD PUPPY, or **WATER DOG**, common name for any of four species of aquatic salamanders constituting the genus *Necturus*, common in some rivers and lakes of eastern and central United States. Their importance to man lies in the information they yield to biological study; the animals have three pairs of bushy external gills by which they respire underwater, and a complete set of lungs which they do not use. They are sometimes eaten. Mud puppies attain a length of about 17 in. The flattened, rectangular head, the slimy, dark-brown spotted body, and the laterally compressed tail give the animal a dangerous appearance belied by its harmless nature. Sluggish in disposition, the mud puppy spends most of the day in the mud, crawling about on its four weak legs. It subsists on aquatic worms, insect larvae, fish eggs, and thin-shelled shellfish. Mud puppies are oviparous; the female lays sixty to seventy eggs singly

in shallow water in late spring. The newly hatched young, which closely resemble the parents, are about $\frac{3}{4}$ in. long. The commonest species of mud puppy is *Necturus maculosus*.

MUD SNAKE, or **HOOP SNAKE**, common name for a harmless, burrowing colubrid snake, *Farancia abacura*, of the southeastern United States. Adults are black above, with a red belly, and red triangular markings on the sides. They average 4 ft. in length. The short tail tapers abruptly and has a sharp spine at the tip. This snake is sometimes called hoop snake from the erroneous belief that it takes its tail into its mouth and rolls along like a hoop. The same erroneous assumption has been applied to the rainbow snake, *Abastor erythrogrammus*, which also has a spine at the tip of its tail.

The black swamp snake, *Seminatrix pygaea*, which attains a length of only about 1 ft., is sometimes called the red-bellied mud snake, but is not closely related to the true mud snake, and has no tail spine.

MUELLER, Paul Herman. See MÜLLER, PAUL

MUFFLER. See AUTOMOBILE: *Construction; Power Plant; Engine.*

MUFTI, title of a consulting ecclesiastical lawyer in Muslim countries, who, upon request, advises trial judges on the application of religious law in a memorandum called a *fetwa*. Theoretically, any man of learning and respected opinion can issue *fetwas* when requested; but most Muslim states now appoint official muftis for each judicial district.

MUFULIRA, city of Zambia, in Western Province, 40 miles N.W. of Ndola. It is a road hub on a rail spur, and the adjacent copper-mining township has a smelter. Pop. (greater city; 1973 est.) 130,000.

MUGWUMPS (Algonquian, *mugquomp* or *muckquomp*, "a chief"), in American history, term employed to designate dissident members of the Republican Party (q.v.), who, in the Presidential election of 1884, refused to support the nominee of their party, James G. Blaine (q.v.), and supported the Democratic candidate, Grover Cleveland (q.v.), who was elected. The term was first used derisively in a New York City newspaper, the *Sun*, was adopted by the dissident Republicans, and was later used widely to designate the independent members of a political party regarded as likely to bolt the party.

MUHAMMAD, or **MOHAMMED** (about 570–632), founder of Islam (q.v.), born in Mecca, Arabia. He was the son of Abdullah (545?–70) and his wife Amina, both of the tribe of Quraish, the ruling clan of Mecca. His father died about the time of his birth, and his mother died when he

was six years old; the boy was reared by his uncle Abu-Talib. In 595 Muhammad was entrusted with the business affairs of the rich widow Khadija (555?-620?), whom he married the same year. He then became a successful merchant. Khadija, who was several years older than he and who was his closest confidant, bore him two sons and four daughters; one of the daughters, Fatima (q.v.), was the only one of his progeny to survive and bear children.

In the fifteen years following his marriage, Muhammad became greatly concerned about the superstition and ignorance of the Arabs and their lack of a national prophet. He spent much time in meditation, during which he experienced revelation. In 613 he began to preach. According to Muslim tradition, while he was engaged in solitary contemplation on the mountain of Hira, he received his call from God through the angel Gabriel (q.v.). Throughout the remainder of his life Muhammad announced other, similar revelations, many of which were collected to form the Koran (q.v.), the holy scripture of Islam. Muhammad communicated the first revelations only to his immediate family and his intimate friends; his first converts included his wife and daughters, his cousin and son-in-law Ali, his father-in-law, and his friend Abu-Bakr (qq.v.). After three years of private proselytizing he had forty followers and began to preach his doctrines publicly in Mecca. He exhorted the Meccans to abandon their polytheistic tribal and religious customs and to believe in "one true God".

His preaching in Mecca, which endangered the principal source of revenue in the city by threatening to eliminate the profitable pilgrimages to the then pagan shrine of the Kaaba (see Mecca), earned him the hostility of important people. Persistent persecution of Muhammad and his followers finally culminated (622) in a plot to murder the Prophet, but Muhammad was forewarned and emigrated to Yathrib (later Medina, Saudi Arabia), arriving Sept. 24, 622. The Islamic calendar (q.v.) is reckoned from the year of this flight, which is called the Hegira (q.v.).

Muhammad was enthusiastically received in Medina and was asked to restore order in the city, then torn by feud. He established a theocratic state, eliminated internal strife, repulsed attacks by the Meccans, and later launched attacks which first subjugated the city of Mecca and ultimately brought all Arabia under his control. He became judge, lawgiver, and social arbiter of his followers, establishing principles incorporated later in the Koran, and precedents

incorporated in the Sunna, the body of tradition of Islam which is supplementary to the Koran.

After the death of Khadija in 620, Muhammad married several times. The most influential of his later wives was Ayeshah (q.v.), or Aisha, the daughter of Abu-Bakr; she was later named "Mother of the Faithful". Muhammad had one child other than the six whom Khadija bore to him. This was a son, Ibrahim, born to Muhammad by the concubine Mary of Egypt; Ibrahim was a child when he died in 632, a few months before Muhammad.

MUHAMMAD II. See OTTOMAN EMPIRE; TURKEY: *History*.

MUHAMMAD ALI. See ALI, MUHAMMAD.

MUHAMMAD, Elijah. See BLACK MUSLIMS.

MUHAMMED, Jalal-ud-Din. See AKBAR.

MUHLENBERG, originally MÜHLENBERG, family of German origin prominent in the history of the Revolutionary period in America and in the establishment and development of the Lutheran Church (see LUTHERANISM) in America. Most were clergymen, some were also political figures, and one, in the 19th century, was a noted figure in the Protestant Episcopal Church and in the Anglican Communion (qq.v.).

Henry Melchior Muhlenberg (1711-87), born in Einbeck, Hannover, and educated at the University of Göttingen. After serving from 1739 to 1741 as a Lutheran deacon in Germany he came to America in response to a call from the Lutheran congregations of Pennsylvania. He devoted himself particularly to his congregation at New Providence (now Trappe); he also performed the duties of a bishop, overseeing and organizing the Lutheran churches from New York to Maryland. In 1748 he organized the first Lutheran synod, the Ministerium of Pennsylvania, in America.

John Peter Gabriel Muhlenberg (1746-1807), son of Henry, born in Trappe, Pa. Apprenticed to a merchant in Halle, he ran away and joined a British infantry regiment in America. Discharged in 1767, he studied for the Lutheran ministry and became a preacher of note. It appears that he was not ordained in the Lutheran ministry, but in 1772, in London, he was ordained a priest in the Church of England. He served as pastor in Lutheran churches in New Jersey and Virginia until 1775, when, at the request of the American general George Washington (q.v.), he raised a German regiment for the Continental Army. He was successively colonel, brigadier general, and major general in the Continental Army, holding major commands and distinguishing himself by his courage in battle and his administrative merits. After the war he moved to Pennsylvania and

MUIR

served in the United States House of Representatives from 1789 to 1791, 1793 to 1795, and 1799 to 1801. In 1801 he was elected to the United States Senate but resigned in a month to accept an appointment as supervisor of revenue for Pennsylvania. In 1803 he became collector for the port of Philadelphia.

MUIR, John (1838–1914), American explorer and naturalist, born in Dunbar, Scotland. He was a member of the United States Geodetic Survey in the Great Basin (1876–79), and while in Alaska discovered the glacier that now bears his name; see **MUIR GLACIER**. An authority on forestry and forest management, he visited Russia, Siberia, India, Australasia, and the Philippines, to study the forest areas of these countries. In recognition of his efforts as a conservationist and crusader for national parks, Muir Woods National Monument (q.v.), near San Francisco, Calif., was established in 1908. The homes of Muir and his daughter, in Martinez, Calif., were together designated the John Muir National Historic Site in 1964. Muir's works include *The Mountains of California* (1894) and *Our National Parks* (1901).

MUIR GLACIER, one of the largest of the Alaskan glaciers, named for the American explorer and naturalist John Muir (q.v.), who discovered it in 1878. The ice stream flows down the slopes of Mt. Fairweather (15,300 ft.) and enters Glacier Bay as a palisade of ice nearly 2 mi. long and from 136 to 210 ft. high. It forms a barrier across the head of the bay, and reaches 760 ft. below sea level. Muir Glacier is administered as part of Glacier Bay National Monument (q.v.).

MUIR WOODS NATIONAL MONUMENT, region of national interest in Marin Co., Calif., 12 mi. N.W. of San Francisco. It contains a grove of redwood trees; the trees have a maximum height of about 240 ft. and a maximum diameter of about 20 ft. The monument was named in honor of the American explorer and naturalist John Muir (q.v.) who was influential in bringing about the preservation of national forest reserves and the establishment of Yosemite National Park (q.v.). The monument is administered by the National Park Service (q.v.).

MUKDEN, **MOUKDEN**, or (Chin.) **SHENG-KING**, city in the People's Republic of China, and capital of Liaoning Province, in Manchuria, about 425 miles N.E. of Peking. It is an industrial center, where machinery, automobiles, cement, and chemicals are produced. It is connected by rail with all major cities of Liaoning Province and with Peiping and North Korea. From 1625 to 1644 it was the capital of the Manchu dynasty. The city suffered greatly during the Boxer upris-

ing of 1900, and about it was fought, in February and March, 1905, the culminating battle of the Russo-Japanese War (q.v.). With the occupation of Manchuria (q.v.) by Japanese forces from September, 1931, to February, 1932, and the setting up of the puppet state of Manchukuo, the capital was moved to Hsinking (see **CHANGCHUN**). Pop. (1970 est.) 3,750,000.

MULBERRY, common name applied to trees of the genus *Morus*, belonging to the Mulberry family, Moraceae, natives of temperate and warm climates, with deciduous leaves, unisexual flowers in short thick spikes, with a four-parted perianth containing either four stamens or one pistil with two styles, the perianth of the female flowers becoming succulent and closing over the small pericarp, the whole spike coalescing into an aggregate fruit. The common mulberry, or black mulberry, is a native of the middle parts of Asia, but was introduced into the south of Europe more than a thousand years ago, and is now naturalized there. In the United States it is seldom seen except in the South and in California. The fruit is much esteemed for dessert. An excellent preserve and a pleasant light wine are made of it. The leaves are sometimes used for feeding silkworms, as are those of the white mulberry, *M. alba*, or any of its variants. *M. alba* may attain a height of 50 ft.

The paper mulberry, *Broussonetia papyrifera*, native to India, Japan, and islands in the Pacific, frequently planted for ornament and shade in America and Europe, differs from the true mulberry in having the female flowers collected in a globular mass. The islanders of the Pacific cultivate this species and make a kind of clothing from its bark; *B. papyrifera* varies in height from 25 to 40 ft.

MULCH, substances, such as manure, sawdust, leaves, peat moss, straw, or even stones, spread upon the ground to protect the roots of herbs and shrubs and sometimes of recently planted trees from extreme temperature and moisture changes. The term is also applied to a layer of fine, loose, dry surface soil called dust mulch, which is maintained around plants to check evaporation of moisture and promote aeration of the soil. Organic materials used for mulching, such as buckwheat hulls and other cereal chaff, lawn clippings, and finely chopped straw, in addition to protecting the plants, decay in time and increase the humus (q.v.) content of the soil. A further benefit of mulching is that weeds grow sparsely in the mulched area. Natural mulch is formed by fallen leaves and by decaying nonwoody plant parts. Horticulturists are continually experimenting with new materials

to be used as mulches. Shredded tree bark, wood chips, vermiculite, and black polyethylene film have recently been used as mulches.

MULE, hybrid offspring of the male ass and the mare much used and valued in many parts of the world as a beast of burden; see **HYBRID**. The head, ears, croup, and tail resemble those of the ass; but in bulk and stature the mule resembles more the horse, and seems to excel both its parents in sagacity, muscular endurance, surefootedness, and length of life. The hinny, often confused with the mule, is the hybrid offspring of the female ass and the male horse. It has a bushier tail and a heavier body than the mule, and is by nature more tractable.

The fact that male mules are generally sterile has given rise to the mistaken assumption that sterility is a necessary consequence of hybridization. Female mules have been successfully crossed by horse or ass to produce foals.

MULE DEER, common name for a large deer, *Odocoileus hemionus*, of the western and central United States, so called because of its extremely large ears, which measure almost 10 in. in length. This animal attains a height of 42 in. at the shoulder. The name black-tailed deer is sometimes applied to a subspecies of the mule deer in the Rocky Mts. The tail of the mule deer along the basal two thirds is white above and dark below, and at the terminal third is black. It is hunted for its meat and hide.

MÜLHEIM AN DER RUHR, city of West Germany, in North Rhine-Westphalia State, on the Ruhr R., 16 miles N. of Düsseldorf. The city is in the Ruhr (q.v.) region where coal and iron are mined. The chief manufactures are iron and steel products, and an important river business in coal is conducted. Pop. (1970 est.) 192,183.

MULHOUSE (Ger. *Mülhausen*), city of France, in Haut-Rhin Department, in Alsace Province, about 80 miles S.E. of Nancy. A textile center since the 18th century, the city also has a fertilizer industry based on nearby potash deposits. Mulhouse dates from the 9th century. During the Middle Ages it became a free imperial city and it was later allied with the Swiss Confederation. In 1798 the city voted to join France. It was under German rule from 1870 to 1918 when it was returned to France. Pop. (1968) 116,336.

MULLEIN, common name for plants of the genus *Verbascum*, belonging to the Figwort family, and containing more than 250 species, of which some have been naturalized in the United States; see **SCROPHULARIACEAE**. The leaves and stem of the common and larger species are covered with a dense, woolly growth; the flowers form a dense spike 1 ft. long.

MULLENS, Priscilla. See **ALDEN, JOHN**.

MULLER, Hermann Joseph (1890–1967), American geneticist, born in New York City and educated at Columbia University. He taught at the University of Texas from 1920 to 1933, becoming professor of zoology in 1925. From 1933 to 1937 he served as senior geneticist at the Institute of Genetics in Moscow, and for the next three years as research associate in the Institute of Animal Genetics at the University of Edinburgh. From 1945 to 1964 he was professor of zoology at the University of Indiana. Muller's research in the field of genetics, which he began in 1911, was conducted primarily by experimental breeding of the fruit fly *Drosophila* (q.v.). He is best known for his successful induction of mutations (q.v.) of genes in the fruit fly by the use of X rays. For this work he received the 1946 Nobel Prize in medicine and physiology. Muller is known also for his dire warnings concerning the effects of nuclear radiations on the genes of the human race. His writings include the *Mechanism of Mendelian Heredity* (with others, 1915), *Out of the Night* (1935), *Genetics, Medicine and Man* (with others, 1947), *Studies in Genetics* (1962), and numerous scientific papers.

MÜLLER, Paul, also known as **MUELLER, PAUL HERMAN** (1899–1965), Swiss chemist, born in Olten, and educated at the University of Basel. In 1925 he entered the research laboratory of a tanning firm in Basel. There, in 1930, he succeeded in synthesizing two new tanning dyes, which were called irgatan and legatan. He began his investigations of synthetic insecticides in 1935, and in 1939 discovered the insecticidal powers of the chemical compound DDT (q.v.). As a result of his discovery, for which he received the 1948 Nobel Prize in medicine and physiology, DDT was widely marketed as an insecticide and used as such by both the German and Allied forces during World War II.

MULLET, common name for any fish in the unrelated families Mugilidae and Mullidae. Mugilidae contains the gray mullets, small mugiliform fishes, rarely exceeding 2 ft. in length, found in all warm seas. These fish have gray backs and silver-colored sides. Gray mullets live near the shore, feeding on minute organisms which they filter through their sievelike lips. They are extremely sensitive to disturbances in the water, and habitually jump a yard or more into the air when frightened. More than 100 species are known, all of which are edible. The striped mullet, *Mugil cephalus*, found in the Pacific Ocean and on both sides of the Atlantic Ocean, is a well-known species. Mullidae contains the red mullets or surmullets, moderate-

MULLIKEN

sized, acanthopterygian fishes found in tropical waters. They are usually red or orange in color. Surmulletts are characterized by large, thin scales, and by a pair of erectile barbels on the chin. The common European surmullet, *Mullus barbatus*, is about a foot long. The red goatfish, *Upeneus maculatus*, and the yellow goatfish, *U. martinicus*, are common surmulletts found off the coasts of Florida and the West Indies. Most of the surmulletts are edible.

MULLIKEN, Robert Sanderson (1896–), American chemist, born in Newburyport, Mass., and educated at the Massachusetts Institute of Technology and the University of Chicago. After service in the United States Army during World War I and graduate studies at various institutions in the United States and Europe, he joined the faculty of the University of Chicago in 1928,

Fraternal twins, unlike identical twins, are conceived as separate fertilized cells.

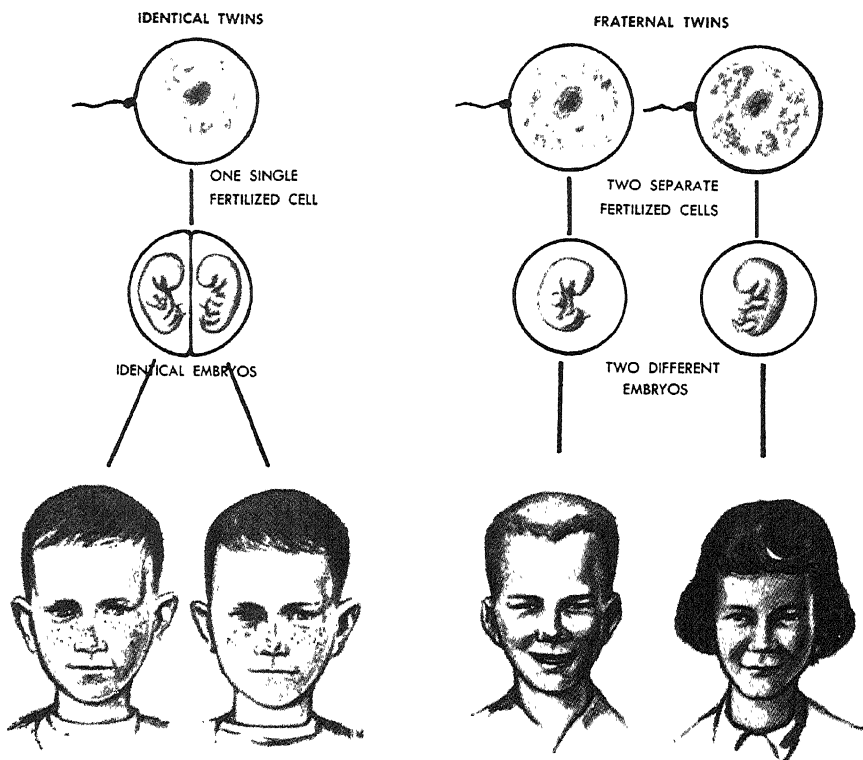
TODAY'S HEALTH, published by the
AMERICAN MEDICAL ASSOCIATION

teaching both chemistry and physics. Mulliken was awarded the 1966 Nobel Prize in chemistry for molecular studies that began when he was a high-school student and resulted in his formulating methods of describing, analyzing, and computing the structure of molecules. Mulliken helped in the development of the atomic bomb during World War II.

MULTAN, city of Pakistan, and capital of Multan Division, on the Chenab R., about 200 miles s.w. of Lahore. The leading manufactures are silk, cotton, carpets, glazed pottery, and enamel work. Multan is an important center of trade where the products of the division, chiefly cotton, wheat, wool, sugar, indigo, oil seeds, and manufactured articles, are shipped by railroad to other parts of the country. Pop. (1971 est.) 678,000.

MULTIPLE BIRTH, birth of more than one offspring at a time, occurring regularly in most mammals, and uncommonly in some of the

TWINNING



larger ones, such as cattle, horses, and man (qq.v.). In humans, the tendency to bear more than one offspring is hereditary (see HEREDITY), and a mother who brings forth twins is likely to have additional twins. Similarly, a twin-bearing mother stands a better-than-average chance of producing triplets. In recent years the use of hormones such as estrogen (q.v.) and drugs such as clomiphene citrate to treat female sterility (q.v.) has increased the incidence of multiple births in women, sometimes resulting in premature delivery of as many as five or six offspring.

Multiple births in human beings arise either from the simultaneous impregnation of more than one ovum or from the impregnation of a single ovum that subsequently divides into two or more parts, each of which develops into a distinct embryo; see EGG; EMBRYOLOGY; GESTATION. Plural offspring developing from a single egg are known as identical; they are always of the same sex, resemble one another very closely, and have similar fingerprints and blood types. Offspring produced from separate ova are known as fraternal; they are not necessarily of the same sex and do not have more than the usual family resemblance of brothers and sisters.

Twins are the most frequent form of multiple birth in man, and identical twins occur only one fourth as frequently as fraternal twins. In the United States one birth in approximately 87 is a twin birth. Triplets are about 87 times rarer than twins, and quadruplets about 87 times rarer than triplets. The present-day frequency of quintuple births is estimated to be one in 8,000,000. These incidence figures are for spontaneously occurring pregnancies. When ovulation has been induced by drugs, the incidence rises.

The prenatal and infant mortality rate in multiple pregnancies is higher than that in single gestations. The danger of premature birth increases progressively with the number of offspring involved. The first quintuplets in medical history to survive were the Dionne quintuplets (q.v.). See also SIAMESE TWINS. G.J.V.

MULTIPLE PERSONALITY. See HYSTERIA: *Dissociative Reactions*.

MULTIPLE PROPORTIONS, LAW OF. See CHEMISTRY: *History of Chemistry: Chemical Principles*.

MULTIPLE SCLEROSIS, disease of the central nervous system in which patches of nerve tissue degenerate and are replaced with neuroglial (nervous connective) tissue. The cause of the disease, that chiefly attacks individuals between the ages of twenty and forty, is as yet unknown. Symptoms vary according to the sites of the le-

sions in the nervous system; the commonest symptoms are blurring of vision, loss of vision or double vision, tremor of the hands, weakness of the extremities, sensory changes such as numbness, tingling, or pain, slurring of speech, and loss of control over the urinary and anal sphincters. The disease is intermittent in most cases; the initial symptoms are usually transient and may last only a few hours or days. They generally disappear after the first attack, leaving the patient symptom free, often for many years, only to recur and disappear again, fully or partially. This waxing and waning of symptoms, that may vary from relapse to relapse, may occur repeatedly over many years, leaving few after effects at first but eventually producing permanent disabilities. Thus the patient often becomes clumsy in his movements and progressively weaker. Occasionally, instead of being intermittent and relapsing, the disease is slowly progressive. It is rarely present as an acute or subacute condition running a progressive course of only weeks or months. Multiple sclerosis is in most cases eventually fatal, death generally occurring as a result of marked debility or infection. No cure for multiple sclerosis has yet been found. L.J.V.

MULTIPLICATION, one of the basic operations in arithmetic (q.v.), the reverse of the process of division (q.v.). Essentially, multiplication is the process of adding a certain number to itself a given number of times; thus if the number 6 is added 5 times, the sum is 30. The same result is obtained by the briefer computation of multiplying 6 by 5. The number multiplied is called the multiplicand, the number by which the multiplicand is multiplied is called the multiplier, and the result is called the product. The operation is expressed as $A \times B = Z$, in which A is the multiplicand, B is the multiplier, and Z is the product. The multiplicand and the multiplier are called reciprocals of each other when their product is 1. The multiplication table, used in memorizing the products of combinations of numbers, usually consists of numbers from 1 to 12 multiplied successively by each of the numbers 1 to 12; in the usual base 10 system, the multiplication table for the numbers 1 through 9 is sufficient.

In multiplying numbers that have more than one digit, the multiplicand is multiplied by each of the digits of the multiplier, starting with the last digit, and the products obtained are added. Very large numbers or a large series of numbers are conveniently multiplied by using logarithms or a computer (qq.v.). The simplest way to check a multiplication is by dividing the pro-

MULTNOMAH FALLS

duct by the multiplicand; if the operation has been performed correctly, the quotient is the same number as the multiplier. The product of two numbers that have the same sign (two positive numbers or two negative numbers) is a positive number; the product of two numbers of opposite sign (one positive and one negative) is a negative number. J.Si.

MULTNOMAH FALLS. See WATERFALL.

MUMFORD, Lewis (1895–), American critic and authority on urban planning, born in Flushing, Long Island, N.Y., and educated at the College of the City of New York, Columbia University, New York University, and the New School for Social Research, New York City. He was editor or associate editor of a number of publications, including the *Sociological Review* (London, 1920) and an annual anthology of American writing, *The American Caravan* (1927–36), and has been associated with several universities. Mumford was elected to the American Academy of Arts and Letters in 1955 and received the United States Presidential Medal of Freedom in 1964. His works include *The Culture of Cities* (1938); *Condition of Man* (1944); *The City in History* (1961); and *The Myth of the Machine: The Pentagon of Power* (1970).

MUMMY. See EMBALMING.

MUMPS, acute, infectious disease, caused by a virus which attacks primarily glandular and nervous tissues, and characterized frequently by swelling of the salivary glands (q.v.). The disease is world-wide in distribution and usually occurs in epidemics. Incidence is highest between the ages of five and fifteen, but mumps may attack persons of any age. Because the salivary gland most often affected is the parotid, mumps is also known as *epidemic parotitis*. In some cases there is involvement of the sex glands, the meninges, or the pancreas. Mumps is spread from person to person by droplets sprayed from the respiratory tract of infected persons, and is highly contagious. The incubation period of the disease varies from eight to thirty-five days. Few fatalities result from mumps, and one attack usually confers complete immunity, because one antigenic type of virus causes this disease.

In children, the first symptoms of mumps are usually mild fever (q.v.), a feeling of illness and chilliness, loss of appetite, and dryness of throat. In two or three days, a dull ache is felt in the region of the ear, usually on one side, and the fever rises to an average of 102° F. (38.9° C.). The affected salivary gland then begins to swell, producing distention in the region of the cheek close to the ear. Two or three days after these symptoms appear on one side of the face, a sim-

ilar process usually takes place on the other side. Maximum swelling on each side occurs about three days after the first appearance of swelling, and then subsides, usually disappearing completely in twelve days. Deafness may occur in children as a result of mumps.

Whereas many patients show only the involvement of the parotid gland, the virus involves the bloodstream and is carried to many organs where it may cause a recognizable disease and characteristic symptoms.

In some cases inflammation of the meninges (mumps meningitis) is the only manifestation of the disease, and this condition is easily confused with nonparalytic poliomyelitis (q.v.), which it closely resembles. Testicular swelling may also be the only manifestation of the disease. In adult males inflammation of the testes occurs in 15 to 38 percent of the cases. When the inflammation is extensive, it may cause atrophy of the gland, resulting in sterility, but it can be controlled by administration of adrenal cortical hormones, such as cortisone (q.v.).

Persons exposed to mumps are usually isolated and quarantined. Injection of gamma globulin (q.v.) from the blood of persons convalescing from mumps is a helpful prophylactic measure immediately after exposure. Many persons have mumps in such a mild form that it is not recognized, and thus acquire immunity to the disease. Immunity to mumps can be determined by the reaction to an injection of killed mumps virus into the skin. Treatment for mumps is symptomatic and includes bed rest, a light diet, and sedatives for relief of pain. A preventive vaccine is now available. H.R.M.

MUNCH, Charles (1891–1968), French conductor, born in Strasbourg. Educated at the Strasbourg Conservatory of Music, he also studied in Paris and Berlin before he returned to his native city to teach violin. In 1926 he was appointed concertmaster and assistant conductor of the Gewandhaus Orchestra in Leipzig. He returned to France in 1932 and became conductor of the Lamoureux Orchestra; in 1935 he founded and became conductor of the Paris Philharmonic Orchestra. Between 1938 and 1946 Munch was conductor of the Paris Conservatory Orchestra, and during the German occupation of Paris in World War II he donated his earnings from these concerts to further the work of the French underground. In 1946 he made his American debut as guest conductor with the Boston Symphony Orchestra, and was its permanent conductor from 1949 to 1962. His experiences as a composer are recounted in *Je suis chef-d'orchestre* (1954; Eng. trans., *I am a Conductor*,

1956). At the time of his death he was leading the first North American tour of the *Orchestre de Paris*, which he founded in 1967.

MUNCH, Edvard (1863–1944), Norwegian painter, born in Lø, in the county of Hedmark. He began painting at the age of seventeen in Christiania (now Oslo). A state grant, awarded in 1888, enabled him to spend several months in Paris. Afterward, for about twenty years, he



"The Bridge" (1889) by Edvard Munch.
Rheinish Picture Archives – City Museum of Cologne

worked mostly abroad, chiefly in Paris and Berlin. A profound melancholy, mirrored in much of his art, descended heavily on him in 1908 and forced him to retire for some months to a Danish clinic. Cured, he returned to Norway, where he lived in relative tranquility.

Many of Munch's themes derive from anxiety, despair, and loneliness, feelings he intensely experienced as a youth when both his mother and older sister died of tuberculosis. These feelings are perhaps most vividly expressed in "The Scream", a lithograph from his first Paris period; another version of this subject, on canvas, was done in 1893. Other prominent themes, appearing mainly in his earlier works (1894–1908), are love and the relationship of woman to man. "The Kiss" (1895), an etching is widely regarded as his most lyric representation of love.

Munch's style, influenced at first by the post-impressionists, became markedly expressionistic, especially during his years in Berlin (see *EXPRESSIONISM*; *POSTIMPRESSIONISM*). Critics today generally consider his etchings, lithographs, and woodcuts, numbering more than 700, as his most significant artistic contribution.

MÜNCHHAUSEN, Baron Karl Friedrich Hieronymus von (1720–97), German soldier, born

in Bodenwerder. He served as a cavalry officer in Russian campaigns against the Ottoman Turks, and reputedly told exaggerated stories of his adventures and exploits. *Baron Münchhausen's Narrative of His Marvellous Travels and Campaigns in Russia* (1785) was written by the German author Rudolph Erich Raspe (1737–94). **MUNCIE**, city in Indiana, and county seat of Delaware Co., about 50 miles N.E. of Indianapolis. It is an important railroad junction and industrial center. The major manufactures are automobile parts, and glass, meat, and electrical products. Oil and natural gas occur in the vicinity. The city is the site of Ball State University, founded in 1918. Muncie was laid out in 1827, and incorporated as a city in 1865. Pop. (1960) 68,603; (1970) 69,080.

MUNDELEIN, village of Illinois, in Lake Co., about 34 miles N.W. of central Chicago. The village has some manufacturing. It is the site of Saint Mary of the Lake Seminary, where a eucharist congress was held in 1926. The village was incorporated in 1909. Pop. (1960) 10,526; (1970) 16,128.

MUNDELEIN, George William, Cardinal (1872–1939), American Roman Catholic prelate, born in New York City, and educated at Manhattan College, New York City, Saint Vincent Seminary, Beatty, Pa., and the Urban College of the Propaganda, Rome. He was ordained in 1895, served as secretary to the bishop of Brooklyn, N.Y., from 1895 to 1898, was chancellor of the diocese from 1898 to 1909, and became auxiliary bishop of Brooklyn in 1909. Mundelein became archbishop of Chicago in 1915, and in 1924 was made cardinal by Pope Pius XI (see *under* Pius). Cardinal Mundelein played an important part in the international Eucharistic Congress held in Chicago in 1926.

MUNHALL, borough of Pennsylvania, in Allegheny Co., on the Monongahela R., about 6 miles S.E. of central Pittsburgh. Steel is the major manufacture. Munhall was a site of the Homestead (q.v.) strikes of 1892. The borough was incorporated in 1900. Pop. (1960) 17,312; (1970) 16,674.

MUNI, Paul (1895–1967), American actor, born MUNI WEISENFREUND in Lemberg, Austria-Hungary (now in Poland). Muni came to the United States in 1902, and was educated in the public schools of New York City. He began his career in 1908, when he appeared with his parents in the Yiddish variety theater. From 1918 to 1926 he performed with the Yiddish Art Theatre in New York. Muni is best known for the intensity and variety of his dramatic portrayals. His first English-speaking part on Broadway was in

MUNICH

1926 in *We, Americans*. This was followed by *Counselor-at-Law* (1931), *Key Largo* (1939), *A Flag Is Born* (1946), *Death of a Salesman* (1949), and *Inherit the Wind* (1955). Muni also appeared in many motion pictures, including *Scarface* (1932), *I Am a Fugitive from a Chain Gang* (1932), *The Story of Louis Pasteur* (1935), *The Good Earth* (1937), *The Life of Émile Zola* (1937), *Juárez* (1939), and *The Last Angry Man* (1959). His portrayal of Louis Pasteur won him the best-actor award of the Academy of Motion Picture Arts and Sciences. He was naturalized a U.S. citizen in 1923.

MUNICH (Ger. *München*), city in West Germany, and capital of Bavaria State, on the Isar R., about 95 miles S.E. of Nuremberg. It is the third largest city in the country and is an important industrial, cultural, and transportation center. A nearby international airport and a network of railroads and highways connect Munich with the rest of West Germany and other cities of Europe.

The old part of the city, on the W. bank of the Isar R., has a number of baroque and rococo buildings, mostly built in the first half of the

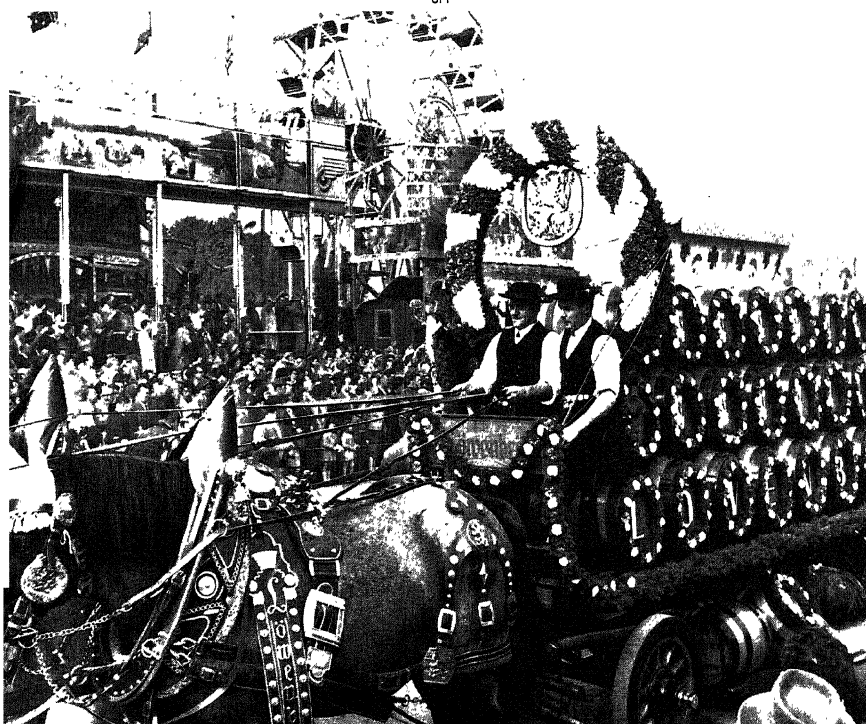
18th century by the rulers of Bavaria, who were inspired by Italian models. In the center of the old section is the Marienplatz, a well-known square, which is dominated by the city hall, the ornate Neue Rathaus, built between 1867 and 1908, stands. Next to the city hall is the 15th-century cathedral *Liebfrauenkirche* ("Church of Our Lady"), a massive late-Gothic brick building with two 320-ft. towers, that is one of the city's major points of interest.

Several of the original gates to the city, including Sendlinger Gate (1310) and Isar Gate (1337) are still standing. The Hellabrunn Zoo or Tierpark, is the largest in Germany. The city also has a large English Garden, with a lake, a Chinese Pagoda, and the Haus der Kunst ("House of Art"), an art gallery, within its confines. The Olympic tower, a 930-ft. high television tower, has an observation platform 607 ft. up. A new stadium, seating 80,000 spectators, was erected for the 1972 Olympic Games (q.v.), which were held in Munich. On the E. bank of the Isar R. is the Maximilianeum (1874-77), the home of the Bavarian parliament.

Cultural Institutions. Among the many museums and art galleries of Munich is the Deutsches Museum (German Museum), it is the largest museum of science and technology in the

A festooned cart bearing kegs of beer during the Oktoberfest, a festival held annually since 1810 in Munich.

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world, located on an island on the Isar R. The Bavarian National Museum contains arts and crafts from the Middle Ages to the 19th century. The leading German art gallery is the Alte Pinakothek (1836), which houses paintings by the old masters.

The National Theater, in which the Bavarian State Opera performs, is the site of the Munich Opera Festival, held every summer. A light opera house and about twenty other theaters in Munich schedule regular performances.

The city is also the seat of the largest university in Germany, Ludwig-Maximilian University, founded in Ingolstadt in 1471 and transferred to Landshut in 1800 and to Munich in 1826.

Commerce and Industry. In addition to the world-famous beer, railroad and electrical equipment, chemicals, optical and precision instruments, and processed foods are made in Munich. Since the late 18th century, when the process of lithography (q.v.) was invented in the city, Munich has been a major printing and publishing center. The city also has a relatively new but active fashion industry, with a large number of clothing manufacturers and textile factories. Many international exhibitions and trade fairs are held in Munich.

History. Munich was founded in 1158 as a mint and marketplace by Henry the Lion (q.v.), Duke of Saxony. In 1255, the powerful Wittelsbach family, who ruled as the dukes of Bavaria (q.v.), made the city their capital. Munich was destroyed by fire in 1327 and later rebuilt by Louis IV (q.v.), Holy Roman Emperor. In 1632, during the Thirty Years' War (q.v.), the city was captured by Gustavus II (q.v.), King of Sweden. Much of the modern development of Munich dates from the reigns of three kings of Bavaria: Maximilian I (1756–1825), Ludwig I, and Ludwig II (*see under* Louis: *Bavaria*). After World War I the city was the center of the political unrest that led to the rise of National Socialism (q.v.) and the future German dictator Adolf Hitler (q.v.). In 1923, Hitler staged the abortive "beer hall putsch", or revolt, in Munich. In 1938 representatives of the major European powers signed the Munich Pact (q.v.) in the city, which ceded to Germany the Sudetenland, a part of Czechoslovakia (qq.v.). During World War II (q.v.), the city was heavily damaged and many old and historic buildings were destroyed. Pop. (1972 est.) 1,338,432.

MUNICH PACT, accord formulated and signed by Germany, Italy, France, and Great Britain at Munich, Germany, on Sept. 29, 1938, concerning the cession of the German-speaking Sudetenland, a region of Czechoslovakia, to

Germany, which it bordered. Local German leaders claimed that the Czech government discriminated against the Sudeten people, and Germany backed their request for self-determination. In a series of negotiations, which began in August, 1938, cession of the Sudetenland to Germany had already been agreed upon in principle by the powers participant in the pact. The pact, signed by Prime Minister Neville Chamberlain for Great Britain, Premier Édouard Daladier for France, Chancellor Adolf Hitler for Germany, and Benito Mussolini (qq.v.) for Italy, merely determined the conditions under which the cession should be made.

The date set in the pact for the beginning of Czechoslovakian evacuation of the territory was Oct. 1, 1938, and German occupation of four specified districts was to take place in successive stages between Oct. 1 and 7. Additional territories of predominantly German population were to be specified by an international commission composed of delegates from France, Germany, Great Britain, Italy, and Czechoslovakia, and those territories were to be occupied by Germany by Oct. 10. The international commission was also to determine and occupy areas in which plebiscites were to be held and fix a date for such plebiscites no later than the end of November. The plebiscites, however, were never held. It was also agreed that if the claims of Hungarian and Polish minorities in Czechoslovakia were not settled in three months, a new conference was to be convened. Great Britain and France agreed, in an annex to the pact, to guarantee the new boundaries of Czechoslovakia against aggression, as did Germany.

Poland and Hungary proceeded to seize much of the remaining Czech territory they coveted. By insisting that the international commission use the figures of the Austro-Hungarian census for 1910 instead of those of the Czechoslovakian census for 1930, Germany was able to claim much additional territory that was predominantly Czech. The dwarfed country that remained was renamed Czecho-Slovakia. In March, 1939, however, the Munich Pact was completely destroyed when the Germans marched into Czecho-Slovakia and subsequently made most of the country a German protectorate. The failure by the British and French governments to invite the Soviet Union to participate in pact discussions was often cited by Soviet spokesmen as one of the causes leading to the German-Soviet nonaggression pact (Aug. 23, 1939). *See EUROPE: History*; and the history sections of the separate articles on the countries mentioned.

MUNICH, UNIVERSITY OF

MUNICH, UNIVERSITY OF, officially LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN, coeducational autonomous institution of higher learning, located in Munich, West Germany. The university is under the jurisdiction of the ministry of education and is supported by the State of Bavaria. The university was founded in 1471 in Ingolstadt by Louis IX, Duke of Upper and Lower Bavaria (1417–79), and was transferred to Landshut in 1800 and to Munich in 1826. The university comprises faculties of theology, law, political economy, medicine, veterinary science, mathematics, forestry, philosophy, and natural sciences. A *Diplom* or degree of *Doktor* is awarded after four years of study and represents the equivalent of American master's-degree work. No postgraduate studies are offered. State examinations are given for professional degrees. The library contains about 915,000 bound volumes. In 1972–73 students numbered 25,222 and the faculty, 1250.

MUNICIPAL BOROUGH, borough in England or Wales having limited powers of self-government.

MUNICIPAL GOVERNMENT, in the United States, public corporation chartered by a State legislature to provide and supervise the governmental services and activities of an urban subdivision in that State. Technically, under U.S. and English law, the term "municipal government" includes incorporated towns, townships, villages, special districts, school districts, and boroughs. As used in this article, however, the term primarily refers to the government of American urban communities and cities. For corresponding units of local government in European countries see **BOROUGH**; **COMMUNE**.

History. The first urban centers in the American colonies were patterned after the English boroughs, with each borough receiving its charter from the king of England or from one of his representatives in the colonies. These colonial boroughs were usually governed by aldermen and councilmen, who were generally elected, and by a mayor and a recorder, the legal advisor to the council, who were appointees of the governor of the colony. During the entire colonial period no more than twenty-four urban communities sought borough charters. Where chartered boroughs did exist, the colonial assemblies often modified the charters, thus establishing the practice of central legislative regulation and supervision of local government.

The New England townspeople preferred the town meeting, which they considered more democratic, and the crown never attempted to force the New Englanders to accept written

charters for their towns. The more densely populated areas were divided into precincts or wards, and selectmen, representing their constituents, made decisions for the community. Town meetings and representative town meetings are still used in several New England municipalities, but for the most part this method of decision making and governing is not practical for large municipalities.

Four major forms of government—weak-mayor-council, strong-mayor-council, commission plan, and council-manager plan—evolved from town meetings. All of these local governmental forms make use of an elected body of representatives called a council, commission, or board. Members of the council are elected either by voters within a particular boundary called a district, ward, or precinct, or by citywide elections. Some cities incorporate both methods. The forms of government differ in the authority and appointing power of the centrally elected figure.

Weak-Mayor Council Plan. The oldest type of city government, the weak-mayor-council plan, was universal until the latter part of the 19th century. Under this plan the mayor, elected by the voters at large, usually has limited appointive and veto powers and little control over the city administration. The council, elected either by wards or by the voters at large, is vested with both legislative and executive powers, including the authority to appoint and supervise administrative department heads. Some municipalities were handicapped by this form of government, since administrative powers were shared independently and no single group or person could be effective.

Strong-Mayor-Council Plan. Presently, the most common form of municipal government in the U.S. is the strong-mayor-council plan. It has its origins in the political reform movements of the late 19th century and conforms to the general 20th-century trend of strengthening the powers of chief executives at all levels of government. Under this plan the mayor, elected by the voters at large, has considerable appointive and removal powers, a strong veto power, almost complete control of administrative department heads, and full responsibility for the city budget. The council, which is usually smaller under this system, is restricted mainly to law-making functions. Another feature of this plan is the reduction of elective offices in the city government.

Commission Plan. The commission form of municipal government was adopted by the city of Galveston, Texas, in 1901, following a hurri-

cane that had devastated the city in the previous year. The mayor-council system, under which Galveston had been governed, was suspended by the State legislature during the crisis and was replaced by a commission composed of five members. Initially appointed but thereafter popularly elected, each of the commissioners was responsible for a single, different phase of the local administration. The commission plan proved so effective that it was widely adopted throughout the nation, and it appeared to offer an alternative to the control of cities by party machines. Certain potential drawbacks, however, may render the plan ineffective. A serious dispute among the members of the commission over a matter of policy can cause delay and confusion in the handling of urgent municipal affairs. Consequently, many cities that tried the commission plan have reverted to the mayor-council plan or adopted the newer council-manager plan. Others have retained the commission plan but have added an appointed official responsible for overall administrative oversight, without formally adopting the council-manager form.

Council-Manager Plan. Under the council-manager plan of municipal government there is a popularly elected council, which is responsible for making laws. It also selects and employs an authority usually called the city manager, a professional in the field of municipal administration, to manage the day-to-day affairs of the city and direct its administrative agencies. In cities with a population of more than 10,000, the council-manager plan is the most common local governmental form. Moreover, many cities, towns, and counties that have not actually adopted the council-manager form as originally conceived have provided for an appointed official liable for general administration.

Financing Municipal Governments. The majority of revenue for local governments is received by taxing property. Other sources of income are dividends from investment, special assessments, sale of property, and Federal grants. Local governments' expenditures have always exceeded revenues, with their greatest expense being in the area of education. Some of the other services normally provided by the municipality are public safety, health services, sewage collection and treatment, transportation systems, and park and recreation facilities.

Trend Toward Regionalism. A need to develop a closer and more workable relationship between the different units of government became apparent in the mid-20th century. County-city and city-city mergers occurred. Such a

merger created a larger governmental unit, and the new municipality could offer more efficient services to the people. Another form of unification was the establishment of metropolitan councils of governments (COG). A council of governments is created when a group of local governments in an area voluntarily get together to work cooperatively on common, areawide problems. One example is the Association of Bay Area Governments established in 1961 in the San Francisco, Calif., area. Through the Department of Housing and Urban Development, the Federal government provides financial aid to metropolitan councils of governments. See CITY; LOCAL GOVERNMENT; TOWN.

MUNICIPALITY or MUNICIPAL CORPORATION, in law in the United States, public corporation created by a State and under its legislative control. Until recently municipal corporations were formed by a special charter (q.v.) designating specific powers. Presently, however, they may be formed under general statutes. Among the more important provisions in a charter and the general laws of a municipality are those which give a municipality the power to tax and the power to pass ordinances effective as law, for the protection of the public health, safety, morals, and general welfare. The rate of taxation which a municipality may levy is limited in many States by the municipal charter or the State constitution or statutes. Among other rights that may be granted under a charter are the powers to sell bonds or notes, to award franchises, to acquire property, to construct public improvements, and to operate public utilities. For a discussion of the administration of municipal affairs, see MUNICIPAL GOVERNMENT.

MUNICIPAL LAW, in the United States and England, term used to designate the body of law of an individual nation or subdivision thereof, as distinguished from international law (q.v.). Municipal law comprises both public law, the branch of law concerned with the relations between the State and the individual, and private law, the branch of law concerned with the relations between individuals. In the U.S., the term "municipal law" has often been restricted in recent years to the body of legislation regulating municipal administration. See MUNICIPALITY.

MUNICIPAL OWNERSHIP, ownership by a political unit, meaning the public, rather than by a private corporation, of works or services classified as public utilities; see PUBLIC UTILITIES; *Ownership*.

MUÑOZ MARÍN, Luis (1898–), Puerto Rican political leader, born in San Juan. His father was the Puerto Rican leader Luis Muñoz Rivera

(1859–1916), who was instrumental in obtaining a measure of home rule from Spain in 1897 and United States citizenship for Puerto Ricans in 1917; see PUERTO RICO: *History*. Muñoz Marín was educated at Georgetown University, Washington, D.C., but left upon the death of his father, then Puerto Rican resident commissioner in Washington. He worked in New York City as a free-lance writer and translator for ten years. In 1926 he returned to Puerto Rico, serving as editor and publisher of the newspaper *La Democracia*, which his father had founded. He joined the new Liberal Party and supported independence for Puerto Rico. In 1932 he was elected to the Puerto Rico legislature as a senator. In 1937 he left the Liberal Party; one year later he founded the Popular Democratic Party, dedicated to the landless peasants of the island and to close relations with the U.S. In 1940 his party won control of the legislature and he became president of the senate. In 1948, following the U.S. grant of popular election, Muñoz Marín became the first governor to be elected rather than appointed from Washington. In 1952 he was reelected, thus becoming the first governor of the newly created Commonwealth of Puerto Rico. He was elected again in 1956 and in 1960. Under his leadership, Puerto Rico made great economic advances, and Muñoz Marín worked to maintain commonwealth status and favorable relations with the U.S. In 1968 he was elected to a four-year term in the Puerto Rican senate.

Later, as an apolitical, influential elder statesman, he served as Puerto Rican cochairman of the Ad Hoc Advisory Group on Puerto Rico. The group's report was submitted to President Gerald R. Ford of the U.S. in October, 1975.

MUNRO, Hector Hugh, real name of SAKI (1870–1916), British writer, born in Akyab (now Sittwe), Burma, and educated in England. He served with the Indian Imperial Police in Burma in 1893. In 1894 he joined the editorial staff of the London newspaper *Westminster Gazette*. For this publication he wrote a series of lightly satirical political sketches reminiscent of the writings of the British author Charles Lutwidge Dodgson (q.v.). Proving to be highly popular, the articles were collected as *The Westminster Alice* (1902). Meanwhile he had written *The Rise of the Russian Empire* (1900), his sole scholarly undertaking and the only work published under his real name. From 1902 to 1908 he was a foreign correspondent for the London newspaper *Morning Post*. He enlisted in the British army at the outbreak of World War I and was killed in action in France. His works, many of which have

fantastic settings and characters, are distinguished by an urbane wit and delicate, often biting, irony. Munro is best known as a writer of short stories. His collected works in this form include *Reginald* (1904), *Reginald in Russia* (1910), *Chronicles of Clovis* (1911), *Beasts and Super-Beasts* (1914), and *Short Stories of Saki* (posthumously published, 1930). Among his other works are the novels *The Unbearable Basington* (1912) and *When William Came* (1913). **MUNSEY, Frank Andrew** (1854–1925), American newspaper and magazine publisher, born in Mercer, Maine. In 1882 he moved to New York City, where he edited and published *The Golden Argosy*, a juvenile weekly. The following year he shortened its title to *The Argosy* and made it an adult monthly. In 1889 he increased his holdings in the magazine field, publishing *Munsey's Weekly* (later *Munsey's Magazine*), *All-Story Weekly*, and *Current Mechanics*. He then entered the field of newspaper publishing, establishing and acquiring by purchase several newspapers, including the *Washington Times*, the *Baltimore News*, the *New York Sun*, the *New York Globe*, the *New York Mail*, the *New York Telegram*, and the *New York Herald*. Munsey was a pioneer in the publication of cheap illustrated magazines, *Munsey's* being the first magazine of its kind to sell for ten cents a copy. He also wrote such popular novels as *Afloat in a Great City* (1887), *The Boy Broker* (1888), *A Tragedy of Errors* (1889), *Under Fire* (1890), and *Derringforth* (1894). He bequeathed the bulk of his fortune, estimated at \$40,000,000, to the Metropolitan Museum of Art (q.v.) in New York City. **MUNSTER**, largest of the four provinces of the Republic of Ireland, and an ancient kingdom of Ireland, bounded on the n. by the Province of Connaught, on the e. by the Province of Leinster, and on the w. and s. by the Atlantic Ocean. It contains the six counties of Clare, Cork, Kerry, Limerick, Tipperary, and Waterford (qq.v.). Area, 9315 sq.mi.; pop. (1971) 882,002. **MÜNSTER**, city and port of West Germany, in North Rhine-Westphalia State, on the Dortmund-Ems Canal, about 70 miles n.e. of Cologne. The city is an industrial center that manufactures machinery, hardware, and porcelain goods and processes agricultural products from the surrounding area. It is the seat of a university (founded in 1780) and has remains of medieval architecture, including the 13th-century Romanesque and Gothic cathedral and the Gothic townhall, in which, in 1648, the Peace of Westphalia was signed; see WESTPHALIA, PEACE OF. The city was founded about 800 A.D. Pop. (1970) 198,900.

MUNTHE, Axel Martin Fredrik (1857–1949), Swedish writer, physician, and philanthropist, born in Sweden, and educated in that country at Uppsala University, and also at the Sorbonne, Paris. He became a noted physician and one of the leading psychiatrists of his time, practicing chiefly in Paris and in Italy. He donated his services to victims of plagues and earthquakes, and those injured during World War I. He also established bird sanctuaries and aided the needy and the blind. Munthe became famous as an author with *The Story of San Michele* (1929), an autobiography pervaded by his pity for the victims of cruelty.

MUNTJAC or **MUNTJAK**, or BARKING DEER, or JUNGLE SHEEP, common name for any of the small Asiatic deer constituting the genus *Muntiacus*. They are characterized by short, twotined antlers, and by canine teeth prolonged into tusks in the adult males. Muntjacs stand about 2 ft. high at the shoulder. They inhabit densely wooded regions, and habitually utter a characteristic doglike cry. *M. muntjak*, a typical species, is golden tan above and white below, with dark-brown limbs and face.

MUON. See MESON.

MURAD, or AMURATH, name of five sultans of the Ottoman Empire (now Turkey).

Murad I (1319–89), surnamed KHUĐAVENDIGHIAR, Sultan (1359–89), succeeded his father Orkhan (1288?–1362?). He completed the organization of the Janizaries (q.v.), a body of slave infantry and was the first Ottoman sultan to gain a definite foothold in Europe, conquering Adrianople in 1361, Maritsa in 1363, and Samokov in 1366. He captured Sofia in 1383 and defeated an alliance of Albanian, Hungarian, Moldavian, and Serbian forces in the Battle of Kossovo (1389). After this triumph, he was stabbed by a Serbian nobleman.

Murad II (1403?–51), Sultan (1421–44), succeeded his father Mohammed I (1389?–1421). He ruled until 1444, when he abdicated in favor of his fourteen-year-old son. Throughout his reign he struggled with the Bosnians and Hungarians, sustaining many defeats and the loss of Serbia (1444). He returned frequently from his retirement to suppress the enemies of his son. Until his death at Adrianople, he continued to war with the countries to the west of Turkey.

Murad III (1546–95), Sultan (1574–95), succeeded his father Selim II (1524–74). The corruption of his reign, which marked the beginning of the decline of the Ottoman Empire, negated his victorious campaigns in Georgia, the Crimea, the Caucasus, Yemen, and Persia. After their Persian conquests, the Janizaries returned

to threaten his power, but the outbreak of another war in 1592, this time on the western front, removed the menace.

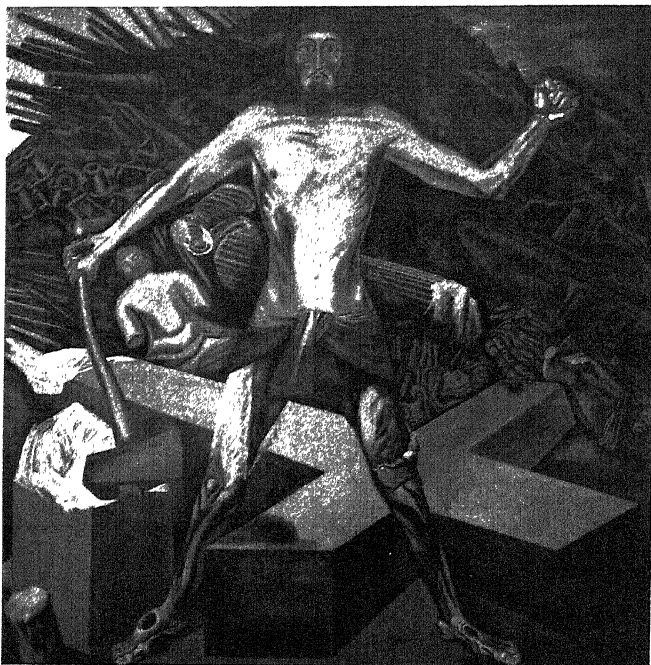
Murad IV (1609–40), Sultan (1623–40), succeeded his uncle Mustafa I (1591–1639?). He ruled with autocratic power after crushing rebellious officials in Asia Minor. During his reign all criminal offenses were punished by death and the number of people executed is reputed to have been more than 100,000. He waged war against Poland and, contrary to precedent, personally commanded his troops in a Persian campaign and was present at the capture of Baghdad in 1638.

Murad V (1840–1904), Sultan (1876), succeeded to the throne when his uncle Abdul-Aziz (1830–76) was deposed, but three months later he was declared insane and was succeeded by his brother Abdul-Hamid II (see under ABDUL-HAMID).

MURAL PAINTING, branch of art and interior decoration consisting of the adornment of walls and ceilings by painting. Consequently, it is closely allied with architecture. The four major mediums it employs are encaustic (see PAINTING, ENCAUSTIC), fresco, oil painting, and tempera painting (qq.v.).

Mural painting is a very ancient art form; it is found on the walls of prehistoric caves, most notably in the caves of Altamira, Spain, and in the Lascaux caves of southern France; see ART: History. Murals were highly developed by the ancient Egyptians, the Minoans of Crete, and the Greeks; see EGYPTIAN ARCHITECTURE AND ART; GREEK ART AND ARCHITECTURE: *The Classical Period*; MINOAN CULTURE. A remarkable series of early wall paintings in the Buddhist caves of Ajanta, India, significantly influenced the development of classical Asian art; see INDIAN ART AND ARCHITECTURE: *Painting*. The Etruscans, and later the Romans, produced excellent murals in several styles; decorations of Roman private dwellings show an especially great diversity of mural styles and subjects; see ETRURIA: *Culture*; ROMAN ARCHITECTURE. In the early Christian and Byzantine churches a religious solemnity was introduced into murals; see BYZANTINE ART: *Painting*; CHRISTIAN ART, EARLY: *Painting and Mosaics*. During the Gothic period (see GOTHIC ART) mural decoration was largely displaced, outside of Italy, by mosaics, stained glass, and tapestries. It was revived, especially in Italy in the 13th century (see GIOTTO), and reached its height with the great masters of the first half of the 16th century; see ITALIAN ART AND ARCHITECTURE: *Painting*. Toward the end of the 16th century it again declined. In modern times mural painting has experienced

MURAL PAINTING



"Modern Migration of the Spirit," a panel by the Mexican painter José Clemente Orozco in the Baker Memorial Library, Dartmouth College.

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another revival, although the old techniques have for the most part been abandoned. Modern murals are painted in oil on canvas, which is later attached to the walls in fired porcelain enamel, and in liquid silicates and acrylics.

In the United States no mural painting of note was produced until 1876, when the American artist John La Farge (q.v.) was commissioned to decorate the interior of Trinity Church, Boston. In 1878 the landscape and portrait painter William Morris Hunt (see *under* HUNT) painted the mural decorations of the Capitol in Albany, N.Y.; only a copy of this work remains, in the Pennsylvania Academy of Fine Arts. Between 1891 and 1893 various artists executed murals for the buildings of the Columbian Exposition in Chicago. Shortly thereafter the noted artists John Singer Sargent and Edwin Austin Abbey (qq.v.) painted mural decorations in the Boston Public Library. A huge example of early American mural painting is in the Library of Congress, completed in 1897 by more than a score of artists.

In the 20th century the popular demand for mural art has induced many fine artists to master this form. Typical examples of modern murals are the large wall paintings in Lincoln Center for the Performing Arts, New York City, by

the Russian-born artist Marc Chagall (q.v.), and Chagall's painting on the ceiling of the Paris Opera House. Mexican painters contributed greatly to the revival of mural painting. Outstanding in this group are Diego Rivera, who painted notable murals in the National Palace, Mexico City, and José Clemente Orozco (qq.v.), who executed striking murals in Mexico City and many places in the U.S.

MURAT, Joachim (1767–1815), marshal of France and King of Naples (1808–15), the son of an innkeeper in France. He left his theological studies to join the army at the outbreak of the French Revolution. As an officer of Napoleon I (q.v.), Emperor of France, he served in Italy and in Egypt, and rose to the rank of general of a division (1799). He contributed to the victories at Austerlitz (1805), at Jena (1806), and at Preussisch Eylau (1807). In 1806 he became the grand duke of Berg, and on Aug. 1, 1808, Napoleon proclaimed him Joachim I, King of Naples. In the expedition against Russia (1812) he commanded the army after Napoleon left it. After crushing the Austrians at Dresden (1813), and helping to fight the disastrous battle of Leipzig (1813), he concluded a treaty with Austria; but, as soon as he learned of Napoleon's escape from Elba, he commenced a hasty war against

Austria. Murat was, however, defeated at Ferrara and again at Tolentino (1815). After Napoleon's final overthrow he took refuge in Corsica. In an attempt to regain Naples he was arrested and executed.

MURCHISON, Sir Roderick Impey (1792–1871), British geologist, born in Tarradale, Scotland, and educated at the Royal Military College, Great Marlowe. He served in the Napoleonic Wars (q.v.), and then turned his attention to geology. After extensive studies of rock strata, he identified the Silurian Period (q.v.), and with the British geologist Adam Sedgwick (1785–1873), he established the Devonian Period (q.v.). Murchison also made a geological expedition to Russia. He was knighted in 1846 and made a baronet in 1866. He endowed a chair of geology at the University of Edinburgh.

MURCIA, city in Spain, and capital of Murcia Region and Murcia Province, on the Segura R., 220 miles s.e. of Madrid. The surrounding coastal plain, called the *huerta*, is a rich irrigated garden area that produces oranges, almonds, cereals, olive oil, pepper, and truck-farm products. The city is a transportation and trade center; its industries include silk and cotton spinning, fruit and vegetable canning, sawmilling, tanning, liqueur and brandy distilling, and the manufacture of chemicals, explosives, apparel, aluminum products, furniture, brick and tile, and soap. Narrow, twisting streets are found in the old part of the city n. of the river, the banks of which are lined with promenades. Points of interest in the city are a university (1915); a provincial museum of history, archeology, and art; the Cathedral of Santa María, begun in 1358; and the baroque 17th-century Ermita de Jesús, with a museum of the art of the city's native sculptor, Salzillo. An annual Holy Week procession is held here, and the city is prominent as the site of the palace of the bishop of Cartagena-Murcia. By tradition founded by the Moors in the 9th century, the city was capital of an intermittently independent or vassal Moorish kingdom until 1243, when it was taken by Castile and annexed to that kingdom in 1266. Pop. (1970) 243,759.

MURDER, in criminal law, the killing of a human being with intent to cause the death of any person. Murder is distinguished from manslaughter (q.v.) in that in the latter the intent to kill is absent. In most States of the United States, criminal codes distinguish between two degrees of murder, although as many as five degrees are distinguished in some States. In general, murder in the first degree involves a deliberate, premeditated design to effect the death of the per-

son killed; murder in the second degree involves the intent to effect death, but without premeditation and deliberation. Most States classify a homicide that occurs during the commission of a felony (qq.v.) as first-degree murder, even though the element of premeditated intent is absent. In some States the commission of an act in itself imminently dangerous to others, such as throwing a bomb into a crowd and causing death, is classified as first-degree murder. Prosecution for murder is by indictment, and the maximum punishment (qq.v.) in most States is death; see CAPITAL PUNISHMENT. In States in which the death penalty has been abolished, the maximum penalty is life imprisonment in a State penitentiary.

MURDOCH, (Jean) Iris (1919–), Irish writer, born in Dublin, and educated at Somerville College, University of Oxford. In 1948 she was appointed a fellow and tutor in philosophy at Saint Anne's College, University of Oxford. Her first published book, *Sartre, Romantic Rationalist* (1953), is a study of existentialism and of the French philosopher Jean-Paul Sartre (qq.v.).

Miss Murdoch began a career as a successful writer of fiction with *Under the Net* (1954). A decade later, with her adaptation of the novel *A Severed Head* (novel, 1961; play, 1963), she also became a dramatist. Among her other works are the novels *The Sandcastle* (1957), *The Italian Girl* (1964; also a play, 1967), *A Fairly Honourable Defeat* (1970), and *An Accidental Man* (1972). Regarded as a master stylist and craftsman, she invariably presents in her fiction a group of sophisticated intellectuals in a tangled web of interpersonal relationships that enables her to give full rein to her training as a philosopher.

MURFREESBORO, city in Tennessee, and county seat of Rutherford Co., on the West Fork of Stones R., 33 miles s.e. of Nashville. The city is a trading center for cotton and cattle and the manufactures of hospital equipment, textiles, and dairy products. In Murfreesboro is Middle Tennessee State University (established in 1909). Near the city is Stones River National Cemetery, the site of a Civil War battle; see STONES RIVER BATTLE OF. Murfreesboro was incorporated in 1817. From 1819 to 1825 it was the State capital. Pop. (1960) 18,991; (1970) 26,360.

MURIATIC ACID. See HYDROCHLORIC ACID.

MURILLO, Bartolomé Esteban (1617–82), Spanish painter of religious and secular subjects born in Seville. In the private collections of Seville, he was able to study the works of such masters of art as Rubens, Van Dyck, Raphael, and Correggio (qq.v.); these paintings profoundly influenced his art. His early works,

MURMANSK

depictions of the Madonna and of the Holy Family, were dry in character, but he soon developed a warm, atmospheric quality in his painting, executing in 1645–46 eleven scenes from the lives of Saints Francis, Diego de Alcalá, Clara, and Gil, that established his fame. Murillo was the first president of the Seville Academy, founded in 1660. He excelled in genre painting (q.v.), depicting ill-clad street urchins in a picturesque manner. From 1671 to 1674 he painted several pictures for the Church of the Confraternity de la Caridad, Seville, some of which are now in the museums of Leningrad, Madrid, and London.

Murillo's works prefigure the development of European and especially Spanish painting in the 18th and 19th centuries. He portrayed Madonnas as beautiful women, and saints as likable Spanish characters, anticipating the element of audacious realism that characterized 18th-century religious art. During the 19th century Murillo's genre paintings won wide acceptance and influenced many of the painters of that period. *See also* SPANISH ART: *Painting*.

MURMANSK, city and seaport of the Soviet Union, in the Russian S.F.S.R., and capital of Murmansk Oblast, on Kola Gulf, an inlet of the Barents Sea, about 400 miles N.W. of Archangel. It is the largest city in the world N. of the Arctic Circle. The major economic activities are shipbuilding, fish processing, textile production, and the processing of phosphate, nickel, and other minerals of the oblast. About 50 miles N.W. of the city is a tidal power station on the Arctic Ocean that began operations in 1968.

The city was developed rapidly during World War I as a port of entry for Allied supplies after Russian ports on the Baltic and Black seas were made inaccessible. In 1915–16, a railroad line was extended to Murmansk from Petrograd (now Leningrad). A joint American, French, and British force occupied the city during the civil war that followed the Russian Revolution (q.v.). In World War II, the port again received Allied supplies. Pop. (1970) 309,000.

MURORAN, city of Japan, in Hokkaido Prefecture, on Hokkaido Island, at the northeastern entrance to Uchiura Bay on the northern side of the Etomo Promontory, 55 miles S.W. of Sapporo. The southern rail terminus of the Muroran Line and a port with steamer connections to both Aomori and Tokyo on the island of Honshu, the city exports coal, paper, and lumber. It is an important producer of iron and steel and has shipbuilding facilities. It is also the site of the Seaweed Research Laboratory of Hokkaido University. Pop. (1970 est.) 162,059.

MURPHY, John Benjamin. *See* SURGERY: *Modern Surgery: Curative Surgery*.

MURPHY, William Parry (1892–), American physician, born in Stoughton, Wis., and educated at Oregon and Harvard universities. In 1923 he began practicing medicine in Boston and teaching at Harvard University Medical School, where he was made a lecturer emeritus on medicine in 1958. Murphy's most important research was in the fields of diabetes and diseases of the blood; *see* BLOOD: *Blood Diseases*; DIABETES MELLITUS.

He was codiscoverer with the American physician George Richards Minot (q.v.) of the liver treatment for pernicious anemia (q.v.). For this discovery Murphy shared the 1934 Nobel Prize in medicine and physiology with Minot and the American pathologist George Hoyt Whipple (q.v.). He wrote *Anemia in Practice—Pernicious Anemia* (1939).

MURRAY, principal river of Australia. It rises in the Australian Alps, in S.E. New South Wales, and flows generally N.W., forming most of the border between New South Wales and Victoria. In South Australia, it turns S. and passes through Lake Alexandrina to the Indian Ocean at Encounter Bay. The Murray R. system drains an area of approximately 400,000 sq.mi. The chief tributaries are the Murrumbidgee and Darling rivers; with the Darling R. the Murray is 2310 mi. long. New South Wales, Victoria, and South Australia have built several irrigation works on the Murray, including Hume Reservoir.

MURRAY, Gilbert, in full GEORGE GILBERT AIMÉ MURRAY (1866–1957), British classical scholar, born in Sydney, Australia, and educated at Saint John's College, University of Oxford. He was professor of Greek at the University of Glasgow from 1889 to 1899 and at Oxford from 1908 to 1936. After World War I, he worked for the cause of the League of Nations (q.v.). He is best known for his translations of Greek plays into English verse and for his critical editions of the works of Euripides (3 vol., 1901, 1904, 1910) and Aeschylus (1937). Among his other works are *Euripides and His Age* (1918), *The Classical Tradition in Poetry* (1927), *The Ordeal of This Generation* (1929), *Stoic, Christian and Humanist* (1940), *Greek Studies* (1946), *From the League to U.N.* (1947), and *Hellenism and the Modern World* (1953).

MURRAY, Sir James Augustus Henry (1837–1915), British lexicographer, born in Denholm, Roxburgshire, Scotland. He was engaged in teaching for thirty years, from 1855 to 1885, during which time his reputation as a philologist steadily grew. In 1879 he assumed the edi-

torship of the *New English Dictionary* for the Philological Society and for the Oxford University Press. The work, which owed its general plan and much of the work on details to Murray, was completed after his death in 1928. He was knighted in 1908.

MURRAY, John (1741–1815), Universalist clergyman, known as “the father of American Universalism”, born in Alton, Hampshire, England. He was excommunicated by the Methodists at Whitefield’s Tabernacle, London, after accepting Universalist principles as taught by James Rely (1722?–78). In 1770 he emigrated to America and preached the doctrine of universal salvation throughout New England. During the American Revolution he served as chaplain in the Continental army. Later he established a Universalist society at Gloucester, Mass. After 1793 he was in charge of a Universalist society in Boston. See UNIVERSALISM.

MURRAY, John Courtney (1904–67), American clergyman and educator, born in New York City, and educated at Boston College and Gregorian University in Rome. He entered the Society of Jesus in 1920. After serving as an instructor in the Philippines for three years, he returned to the United States in 1930 to complete his theological studies. He was ordained a priest in 1933. In 1937 he became professor of theology at Woodstock (Md.) College, a post he held until his death. Murray was active in the cause of Christian unity. In 1941 he became editor of *Theological Studies*, a quarterly which frequently included his writings about the problems of interfaith cooperation among Americans. He is the author of *We Hold These Truths* (1961), *The Problems of God: Yesterday and Today* (1963), and *The Problem of Religious Freedom* (1965).

MURRAY, Philip (1886–1952), American labor leader, born in Blantyre, Scotland. He came to the United States at the age of sixteen and became a coal miner in Pennsylvania. He was subsequently instrumental in the formation of a local within the United Mine Workers of America (U.M.W.) and was elected its president. Murray became a naturalized American citizen in 1911. In the following year he was voted a member of the international executive board of the U.M.W., and in 1920 he became international vice-president. In 1935, when the Committee for Industrial Organization was formed within the American Federation of Labor (q.v.), Murray was named to head the organizing committee of the steel workers; he directed the successful campaign for the organization of the hundreds of thousands of workers in the steel

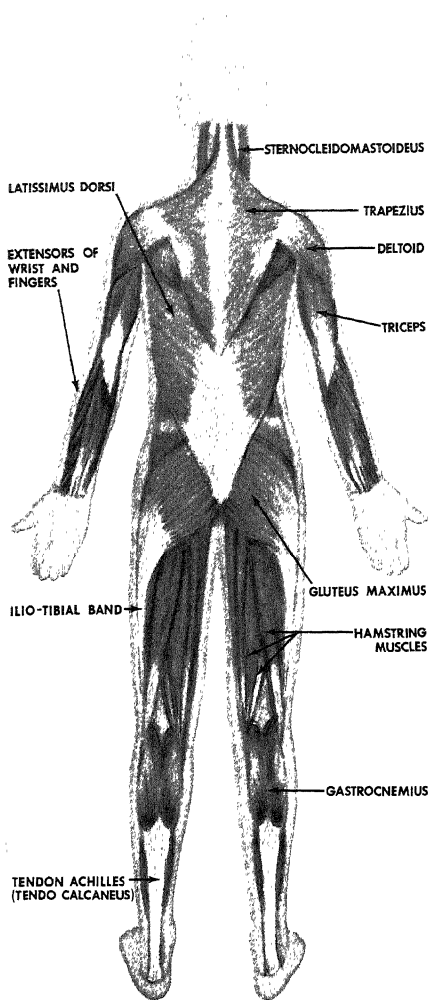
industry. The result of this campaign was the formation of the United Steel Workers of America in 1940; Murray was elected its first president, and in the same year succeeded labor leader John L.(ewellyn) Lewis (q.v.) as president of the Congress of Industrial Organizations (q.v.). In 1942 Murray’s openly avowed support of the policies of President Franklin Delano Roosevelt (q.v.) caused him to be ousted from the vice-presidency of the U.M.W. by Lewis, who was violently opposed to those policies. As the leader of the C.I.O., then having a membership of more than 7,000,000, Murray was one of the most powerful figures in the American labor movement; as a labor leader he advocated moderate reform policies and avoided radicalism.

MURROW, Edward R(oscoe) (1908–65), American radio and television executive and commentator, born in Greensboro, N.C., and educated at Washington State College. He was assistant to the director of the Institute of International Education from 1932 to 1935, when he joined the staff of the Columbia Broadcasting System (C.B.S.) as director of talks and education. In 1937 he became head of the C.B.S. European Bureau. Murrow won acclaim as a news commentator through his broadcasts from London during World War II. From 1945 to 1947 he was C.B.S. vice-president in charge of public affairs; he was elected to the board of directors in



Edward R. Murrow, shown broadcasting from London. UPI

1949. Subsequently he conducted (1950–51) *Hear It Now*, a radio news program that was adapted for television in November, 1951, as *See It Now*. These documentaries were notable for their realism and bold approach to controversial issues. In *Person to Person*, a television program begun in 1953, he interviewed famous or un-



The muscles of the human body.

Laura Dean Leventhal—adapted from TODAY'S HEALTH,
published by the AMERICAN MEDICAL ASSOCIATION

usual persons in their own homes. Murrow received many awards for his able reporting and interpretation of the news, including, in 1964, the Presidential Medal of Freedom. In 1961 he

left C.B.S. to head (1961–64) the United States Information Agency (q.v.).

MUSAPH. See PRAYER, JEWISH.

MUSCAT, capital and port of the independent sultanate of Oman, at the s.e. end of the Arabian Peninsula, on the Gulf of Oman. In 1968 a plan was adopted to modernize the city; a new harbor was being designed, and new houses, government offices, and a school and hospital were under construction. Chief exports of Muscat include dates, mother-of-pearl, and oil. Pop. (1970 est.) 18,000.

MUSCAT AND OMAN. See OMAN.

MUSCATINE, city in Iowa, county seat of Muscatine Co., on the Mississippi R., about 50 miles s.e. of Cedar Rapids. The industries of Muscatine include fisheries, tanneries, and plants producing buttons, chemicals, foodstuffs, machinery, and fabricated metal products. Settled in 1833, the city was incorporated in 1839. Pop. (1960) 20,997; (1970) 22,405.

MUSCLE, tissue or organ of the animal body characterized by the ability to contract, usually in response to a stimulus from the nervous system (q.v.). The basic unit of all muscle seems to be the myofibril, a minute, sensitive, threadlike structure composed of complex proteins. It is situated within the muscle cell or fiber, there being several myofibrils in each muscle cell. Three types of muscular tissue are recognized: smooth, skeletal, and cardiac.

Smooth Muscle. Unstriated, visceral, or involuntary muscle is composed of spindle-shaped cells, each having a central nucleus. The cells have no cross striations, although they do exhibit faint longitudinal striations. Stimuli for the contractions of smooth muscles in man are mediated by the autonomic nervous system. Smooth muscle is found in the skin, reproductive system (qq.v.), viscera, major blood vessels, and excretory system; see STOMACH; CIRCULATION OF THE BLOOD; EXCRETION.

Skeletal, or Striated, Muscle Tissue. This is composed of long fibers surrounded by a membranous sheath, the sarcolemma. These fibers are elongated sausage-shaped cells containing many nuclei, and clearly display longitudinal and cross striations. Skeletal muscle is supplied with nerves from the central nervous system, and because it is partially under the control of the will, it is also called voluntary muscle. Most skeletal muscle is attached to portions of the skeleton (q.v.) by connective-tissue attachments called tendons. Contractions of skeletal muscle serve to move the various bones and cartilages of the skeleton. Skeletal muscle forms most of the underlying flesh of vertebrates (q.v.).

Cardiac Muscle. This muscle tissue composes most of the vertebrate heart (q.v.). The cells, that show both longitudinal and imperfect cross striations, differ from skeletal muscle chiefly in having centrally placed nuclei, and in the branching and interconnecting of fibers. Cardiac muscle is not under voluntary control. It is innervated by, or supplied with nerves from, the autonomic nervous system, but autonomic impulses merely speed or slow its action, and are not responsible for the continuous rhythmic contraction characteristic of living cardiac muscle. The mechanism of cardiac contraction is not as yet understood, but a basic characteristic is its ability to contract rhythmically.

Functions. Smooth muscle is found in organs made up also of other tissues, such as the heart and intestines, that contain layers of connective tissue. Skeletal muscle is usually found in bundles, composing muscular structures resembling organs in function. These often ripple the skin visibly during muscular action. The shape of the muscular organ is dependent upon its location and function. Such a muscle structure is named scientifically according to its shape, function, or attachments: the trapezius muscle of the back, for example, is so called because it looks like a geometrical figure known as a trapezoid; and the masseter (Gr. *masētēr*, "a chewer") muscle of the face is so called because it is used in chewing food.

Muscles that are given proper exercise react to stimuli quickly and powerfully, and are said to possess tone. As a result of excessive use, muscles may hypertrophy, that is, increase in size because of an increase in size of the individual muscle cells. As a result of prolonged disuse, muscles may atrophy, or diminish in size, and become weaker. In certain diseases, such as various forms of paralysis (q.v.), the muscles may atrophy to such a degree that they are reduced to a fraction of their normal size. See MUSCULAR DYSTROPHY.

See also HISTOLOGY; REFLEX. P.J.H. & W.S.Ro. **MUSCLE SHOALS**, series of rapids on the Tennessee R., in Alabama, between Lauderdale Co. to the N. and Colbert and Lawrence counties to the S. The rapids, about 37 mi. long, are now submerged in Lake Wilson, a reservoir created (1925) by the completion of Wilson Dam at their W. extremity. Prior to completion of the dam, the shoals section of the Tennessee R. had a drop of 134 ft. and was unnavigable. Although the section was canalized (1831-36), it was only usable during high tide, and was later abandoned. The canal was reopened in 1890. Following extended studies of the navigation prob-

lem and the hydroelectric potentialities of the rapids, the Federal government began construction of Wilson Dam in 1918. Wheeler Dam, at the E. extremity of the shoals, was completed in 1936. Both dams are facilities of the Tennessee Valley Authority (q.v.).

MUSCOVITE. See MICA.

MUSCOVY. See RUSSIA: *The Growing Importance of Moscow*.

MUSCULAR DYSTROPHY, crippling disease characterized by gradual wasting of skeletal muscle. The clinical course is progressive, with gradual increase in weakness and diminution in muscle mass and function until the patient is confined to a wheelchair. There are no remissions; a hereditary origin can usually be demonstrated. Four or more clinical forms of the disease are recognized, all with similar pathological features. Their classification is based on pattern of inheritance, age when symptoms first are noted, distribution of the muscles earliest involved, and accumulations of fat that can give certain muscle groups a false appearance of excellent development.

Forms and Symptoms. In the Duchenne form symptoms usually are noted before the age of five. The muscles first affected are those of the pelvis and trunk, resulting in spinal deformity and a waddling gait; see SPINAL COLUMN: *Abnormality and Disease*. The calves commonly are enlarged; muscle contractures, which may develop early, cause the patient to walk on his toes. Increase in weakness is fairly rapid; consequently, the patient may be chair-ridden in early puberty and wasting of practically all muscle groups may be advanced by the late teens. Death may result from respiratory weakness or from involvement of the heart muscle. Contractures, which may be a prominent symptom, can advance rapidly during periods of inactivity and further increase disability. Because inheritance is by an X-linked recessive mechanism, practically all patients are boys. Although females may be affected, such symptoms as may be present are mild and usually not progressive; see HEREDITY: *Sex-Linkage*. Females who carry the genetic mutation may pass the abnormal gene to half of the sons, who will develop the disease and to half of the daughters, who will be carriers. The carrier state in women can often be detected by increased levels of enzymes (q.v.) in the blood; compare HEMOPHILIA.

The facio-scapulo-humeral form of the disease affects both sexes equally and results in weakness and wasting of the shoulder girdle and upper arms. It is usually noted around the onset of puberty. The characteristic weakness of

MUSES

the facial muscles may occasionally be seen during the first years of life. There may be inability to close the eyelids completely or to inflate the cheeks. The smile may be asymmetrical. The clinical course usually is slow; most patients remain ambulatory until an advanced age.

The limb-girdle type of the disease affects muscles of either the shoulder or hip girdle. The disease may begin early or late in life, and usually the course is slow. In the late stages most of the muscles of the body may be affected.

In myotonic muscular dystrophy, delayed relaxation of the muscles accompanies wasting and weakness. Moreover, there may be cataracts of both eyes (see CATARACT) and disturbance of reproductive functions. Onset is usually in the early twenties, and the course generally is slow.

Research and Treatment. Muscular dystrophy is considered to have its origin in a genetic mutation, but the biochemical steps by which this genetic defect manifests itself in the degenerative process in the muscle are not known; see HEREDITY: *Mutation*. Muscular dystrophy generally is considered to be a primary muscular disease because no gross lesions in the nervous system have been demonstrated; whether more subtle neurological changes are present is not yet known. Many programs of research whose objective is to determine the causes of the disease and to develop methods of treatment are supported by the Muscular Dystrophy Associations of America. Until effective treatment becomes available, treatment consists of appropriate general measures and physical therapy, particularly to delay and modify contractures. Accumulation of mucus in the air passages can occur even during a relatively mild respiratory infection because of weakness of the respiratory muscles and feeble cough. Evacuation of mucus from the trachea and tracheostomy may be a lifesaving measure.

A.T.M.

MUSES, in Greek mythology, nine goddesses and daughters of the god Zeus and of Mnemosyne (qq.v.), the goddess of memory. The Muses presided over the arts and sciences, and were believed to inspire all artists, especially poets, philosophers, and musicians. Calliope was the Muse of epic poetry, Clio of history, Euterpe of lyric poetry, Melpomene of tragedy, Terpsichore of choral songs and the dance, Erato of love poetry, Polyhymnia of sacred poetry, Urania of astronomy, and Thalia of comedy.

They were said to be the companions of the Graces and of Apollo (qq.v.), the god of music. They sat near the throne of Zeus (q.v.), King of the gods, and sang of his greatness, and of the origin of the world and man and the glorious

deeds of the great heroes. The Muses were worshipped throughout ancient Greece, especially at Helicon in Boeotia and at Pieria in Macedonia.

MUSEUM, name given by the ancients to a temple of the Muses (q.v.), and afterward used to denote a building devoted to science, learning, and the fine arts. The first was the Alexandrian Museum, founded about 280 B.C. in Alexandria, Egypt. After the revival of learning in Europe the term was applied to collections of antiquities, sculptures, and paintings. Natural history and other science exhibits now form part of the treasures of many museums.

The Ashmolean Museum at the University of Oxford, England, founded in 1683, and the Charleston Museum in Charleston, S.C., established in 1773, were the first museums in their respective countries. Among other notable museums founded during the 18th century were the Vatican Museum in Rome (1740), the British Museum in London (1753), the Museo Nacional in Madrid (1771), and the Musée de la République (1793) at the Louvre in Paris. The American painter Charles Wilson Peale (q.v.) opened the Peale Museum in Philadelphia, Pa., in 1786.

Although the museums of the United States are of comparatively recent origin, their growth has been rapid. The first major American museum developed as a part of the Smithsonian Institution in Washington, D.C. Important art museums in the U.S. are the Metropolitan Museum of Art, the Museum of Modern Art, and the Brooklyn Museum, in New York City; the Boston Museum of Fine Arts; the Art Institute of Chicago; the Detroit Institute of Art; the Worcester Art Museum, Worcester, Mass.; the Pennsylvania Academy of Fine Arts; the Department of Fine Arts of the Carnegie Institute at Pittsburgh, Pa.; the Walters Gallery of Baltimore; the National Gallery of Art and the Corcoran Gallery in Washington; the Albright Art Gallery of Buffalo; the Cincinnati Museum; the Cleveland Museum of Art; the City Art Museum of Saint Louis; the Golden Gate Museum of San Francisco.

The outstanding museums of natural history and science in the U.S. include the American Museum of Natural History and the Museum of the American Indian, both in New York City; the Peabody Museum of American Archeology and Ethnology, a part of Harvard University; the Museum of Comparative Zoology, Cambridge, Mass.; the Peabody Museum of Natural History, a part of Yale University; the Museum of the University of Pennsylvania; the Museum of Art of the Carnegie Institute of Pittsburgh; and the Field Museum of Natural History, Chicago.

Other museums are maintained by various historical, local, and patriotic societies throughout the U.S., and by many universities and colleges. Also classified as museums are the New York Botanical Gardens, the Zoological Gardens in Bronx Park, the New York Aquarium, and the Hispanic Society of America, all in New York City; and similar institutions.

Important museums in Europe include the National Gallery, the Victoria and Albert Museum, and the Wallace Collection in London; the Hermitage, Leningrad; the Prado, Madrid; the Uffizi Gallery, Florence; and those at Vienna and Berlin.

See separate articles on many of the institutions mentioned above.

MUSEUM OF MODERN ART, institution founded in 1929 in New York City to "help people enjoy, understand, and use the visual arts of our time" by the American philanthropists Lillie P. Bliss (d. 1931); Ada Bisbee Sullivan (d. 1939), wife of the American chemist Eugene Cornelius Sullivan (1872–1962); and Abby Aldrich Rockefeller (1874–1948), wife of the American financier John Davison Rockefeller, Jr. (see under ROCKEFELLER). From the opening exhibition, "Cézanne, Gauguin, Seurat, van Gogh", held in 1929 in several rented rooms in the Heckscher Building, New York City, the museum has attempted to reach as wide a public as possible. They have not only collected and exhibited but also sponsored many traveling exhibitions of the finest works available, emphasizing the developments in art since the postimpressionism (q.v.) of the late 19th century. These works are in widely diverse fields, including painting and sculpture, prints, drawings, architectural models and drawings, the graphic arts, photography, films, and, in the design collection, any utilitarian objects judged aesthetically viable. As a result, the museum has come to be known as the foremost purveyor of modern art in the United States and the foremost purveyor of American art in the rest of the world.

In 1939 the museum moved into permanent headquarters on West 53rd Street, designed by the American architects Philip Lippincott Goodwin (1885–1958) and Edward Durrell Stone (q.v.). Since 1939 much additional property and several wings have been added to the original edifice, including the Grace Rainey Rogers Annex (1951) and the Abby Aldrich Rockefeller Sculpture Garden (1953; expanded 1964), both designed by the American architect Philip Cortelyou Johnson (q.v.).

Among the outstanding works in the vast collections of the museum are "Balzac" (1898), a

bronze by the French sculptor Auguste Rodin (q.v.); a rare complete print of *Earth* (1930), a film study of a collective farm that was directed by the Russian motion-picture director Alexander Dovzhenko (1894–1956); the original form-fitting plywood chair (1946) of the American designer Charles Eames (q.v.); and hundreds of photographs by the American photographer Edward Steichen (q.v.).

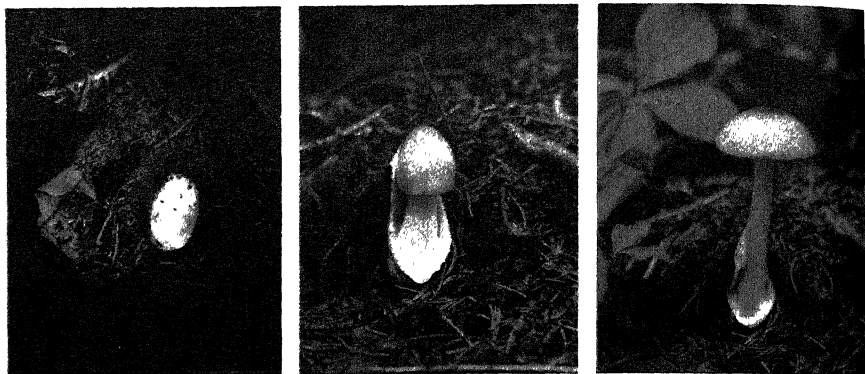
MUSHIN, city of Nigeria, Lagos State, bordering the city of Lagos on the n.w. and about 8 mi. from the city center. On a road and railroad, Mushin produces steel and aluminum products, furniture, concrete, apparel, plastics, textiles, and shoes. Pop. (1971 est.) 176,446.

MUSHROOMS, technically fungi (q.v.) with gills, belonging to the family Agaricaceae, but in popular usage any of the larger fleshy or woody fungi. The application of the term "mushroom" to edible species only and the term "toadstool" to those considered poisonous or otherwise objectionable has no scientific basis; see POISON. For example, two poisonous fungi may be less closely related than are a poisonous species and an edible one.

Of the thousands of species of mushrooms known throughout the world, the great majority are tough, woody, bitter, tasteless, or of such rare occurrence that they may be ignored by the mycophagist. A few species produce death or serious illness when eaten. No simple rule exists for distinguishing edible and poisonous mushrooms, but the characteristics of the more common edible species can be readily learned, and collecting activities should be confined to such species. Morels, puffballs, and other species described below are not ordinarily confused with dangerous types; whenever doubt arises, however, the only safe procedure is to discard all suspicious mushrooms. Fresh commercially grown mushrooms can always be eaten with safety.

Edible Mushrooms. The mushroom known as *Agaricus bisporus* is the species usually grown commercially. It grows from 2 to 4 in. tall and has a fleshy cap from 1¼ to 4 in. across. When the mushroom is ripe, the cap is white or slightly brownish above and pink on the underside. With age, the entire fruiting body changes to dark brown. In the young mushroom the margin of the cap is joined to the stem by a membranous collar, which breaks at maturity to expose the gills on the undersurface of the cap.

Mushrooms are cultivated commercially in caves, dark cellars, or specially constructed mushroom houses in which the proper humidity and temperature are maintained. They are

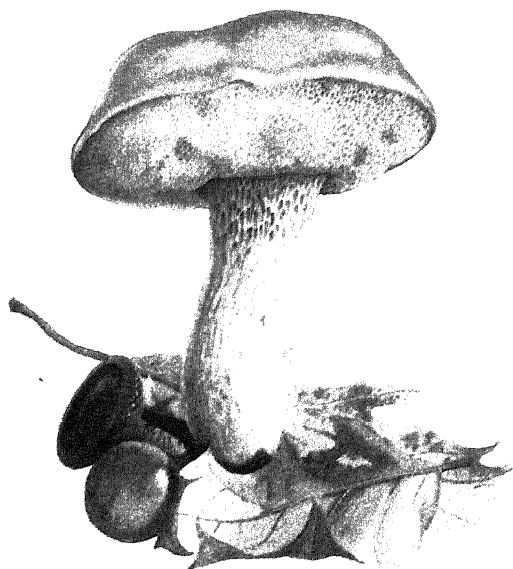


Mushrooms. Plate 1. The sequence of four photographs (above and opposite page) depicts four stages in the growth of the poisonous wood mushroom *Amanitopsis vaginata* (varietus *fulva*). The photographs were made over a period of 48 hr. and depict the rapid growth, true of most varieties of mushrooms, in ideal humid conditions.



Two other common varieties of wild mushrooms are the extremely poisonous *Amanita muscaria* (above, left), also known as fly agaric, and *Marasmius urens* (above, right).

All pictures in Plates 1 and 2, by Ronald Keller



Mushrooms. Plate 2. The humid conditions essential for rapid growth of the larger, fleshy mushrooms are captured in the artist's rendering of the edible *Boletus* (top, right) and the *Hygrophorus* (above).

MUSHROOMS

grown in beds consisting of a mixture of rotted manure and chemically treated straw, over which a layer of soil (casing soil) is spread. The vegetative portion of the fungus, known as the mycelium, or spawn, is used for planting, or spawning, the beds. The mycelium is grown in pure culture under laboratory conditions, thus insuring freedom from insect and fungus contaminants. In a few weeks the spawn invests the entire bed and the mushroom fruiting bodies, or sporophores, begin to appear. Several flushes, or crops, of mushrooms develop in this manner from each spawning. The mushrooms are harvested at frequent intervals and transported promptly to market.

The field or garden mushroom, *A. campestris*, is a common and widespread species in pastures, grassy areas, and manured fields during the summer season. It has the same desirable qualities as the cultivated species and in fact until recently both were considered to be forms of the same species under the name *A. campestris*.

The chanterelle, *Cantherellus cibarius*, a gill fungus with a nutlike flavor, has been popular in Europe since ancient Roman times. Chanterelles are abundant in coniferous and hardwood forests in midsummer. This mushroom grows from 2 to 4 in. tall and has an irregularly lobed orange or yellow cap that is funnel shaped when young but that expands and becomes depressed at the center as it ages. The crisp, heavy specimens are the most desirable for eating.

The edible pore mushrooms of the genus *Boletus* grow in open deciduous woods during summer and early autumn. One species, *B. edulis*, has a stem 2 to 6 in. tall and a fleshy, brown cap 4 to 6 in. across. The cap is covered with a network of fine veins that are white when young and change through yellow to a greenish hue as the plant ages. This mushroom is most tender when the veins are pale yellow. Many other species of the genus *Boletus* are suitable for food.

The oyster mushroom, *Pleurotus ostreatus*, has a pleasant, oysterlike flavor, and is often prepared by dipping in egg and frying slowly. This mushroom grows in bracketlike clusters on decaying tree trunks. It is almost stemless. The fleshy, tender cap is 3 to 5 in. across, tawny olive colored when young, but becoming lighter with age. The oyster mushroom is abundant from June to November.

The sulphur mushroom, *Polyporus sulphureus*, develops on rotten logs, stumps, and even on standing trees, producing a brown wood rot. The fruiting bodies, appearing from late sum-

mer through fall, develop as bright-orange and yellow rosettes or as a series of fan-shaped shelves. These mushrooms may reach a breadth of several feet and a weight of several pounds. Spores are produced in enormous numbers in minute pores on the lower surface. The fungus is edible if gathered in the young, growing stage, but rapidly becomes dry, tough, and honeycombed by insect larvae.

The shaggy-mane, *Coprinus comatus*, is a common and widespread mushroom species appearing from spring until fall in lawns, gardens, and other open spaces. This species grows singly or in clumps and may occur in the same area year after year. It is easily recognized by the attractive cylindrical caps, which are rounded above, 1½ to 2 in. wide and 4 to 6 in. long, and covered with soft, shaggy brown scales. The caps do not expand with maturity, as in most other mushrooms, and the tightly packed gills soon dissolve into a black, inky fluid. The shaggy-mane is considered one of the choicest edible species. Blackened portions should be discarded before the mushroom is eaten.

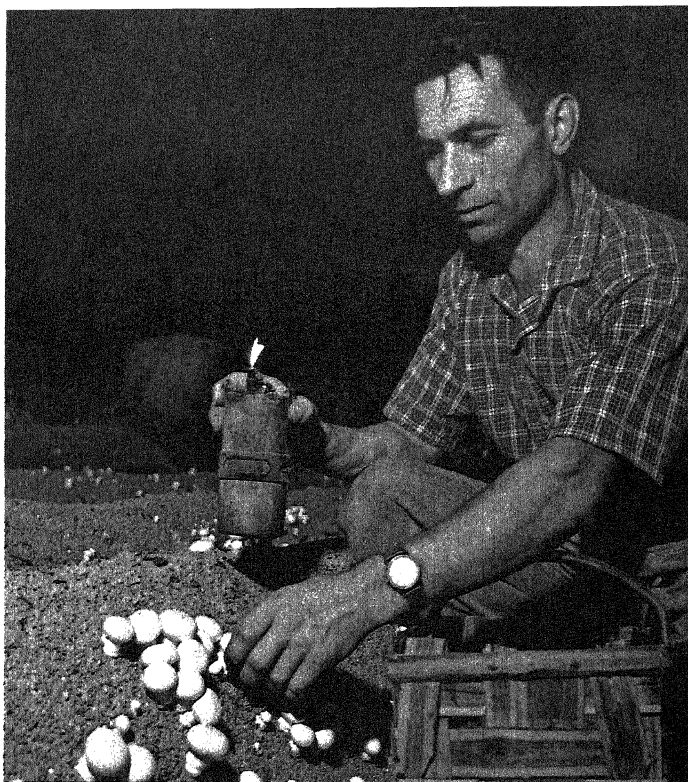
The giant puffballs, including several species of *Calvatia*, do not resemble ordinary mushrooms in shape. They are very large and globose, are 3 to 20 in. in diameter, and have no gills or pores; the spores are borne internally. The fruiting body is creamy white in the edible stage but later becomes brown and powdery and unsuitable for food. Puffballs grow in grassy places and at the edges of woods during late summer and early fall. They do not resemble poisonous or otherwise offensive fungi. Other puffballs, in particular members of the genus *Lycoperdon*, are edible as long as the tissues within are not discolored or larva-infested. Species of the genus *Scleroderma*, which are brown to purple within, should be avoided.

The true morels, *Morchella esculenta* and related species, are excellent edible forms. They grow 2 to 4½ in. tall and have a cap ¾ to 1½ in. wide. The cap is greenish yellow to dark olive in color and is ribbed and pitted like a honeycomb. Morels are commonly found in the spring in old apple orchards and woods, especially under butternut trees, and on burned-over land or areas where wood ashes have been scattered. The morels should not be confused with the false morels of the genus *Gyromitra*, the edibility of which is definitely suspect.

Truffles, especially the Périgord truffle, *Tuber melanosporum*, are subterranean European fungi and probably the most highly prized of the edible fungi. The flesh of all truffles is nearly white when young; as the truffle matures the

Harvesting the meadow mushroom, *Agaricus bisporus*, a common species of commercial mushroom. Edible mushrooms are cultivated in beds made up of straw and manure overlaid with soil. Grown in darkness, with temperature and humidity carefully controlled, they are harvested at frequent intervals. Mushrooms have only slight nutritional value, since their main component is water.

Shostal Associates



flesh becomes darker with a marbling of lighter tissue. Because truffles have a distinctive odor, their underground location may be determined by animals trained for this purpose. Pigs and dogs are the usual truffle hunters. Truffles and the livers of fattened geese are the chief constituents of *pâté de foie gras*.

Poisonous Mushrooms. The number of poisonous fungus species is probably more than 200. Many mushrooms formerly considered doubtful or poisonous have been found to be edible. The original misconception in these cases resulted probably from observation of sickness following the consumption of mushrooms that were no longer fresh and that contained poisons similar to those generated in putrefied meats and vegetables. Some mushrooms, however, especially members of the genus *Amanita*, are extremely poisonous. They contain organic toxins (q.v.) that destroy cells in the central nervous system, blood vessels, kidneys, liver, and musculature. Medically, the most important toxins formed by fungi are ibotenic acid, muscarine, monomethylhydrazine, and the amatoxins. Ibotenic acid is the principal toxin in *A. musca-*

ria, even though muscarine is so named because it is found in that mushroom; muscarine is also synthesized by other poisonous mushrooms, including *Inocybe* species. Monomethylhydrazine occurs in the poisonous false morels, which may be mistaken for true morels (*Morchella*). The amatoxins of *Amanita* species cause severe abdominal cramps, nausea, vomiting, and violent diarrhea. Jaundice (q.v.) and cyanosis sometimes develop, followed by coma and death. Symptoms usually become apparent eight to twelve hours or more after the mushroom is eaten; death may follow in two or three days. Treatment for poisoning by amatoxins and muscarine is supportive after the mushrooms have been cleansed from the gastrointestinal tract. Thiocetic acid is administered to individuals poisoned by amatoxins, but its efficacy is uncertain. Atropine is an antidote for muscarine poisoning but not for other poisons produced by fungi.

Fly agaric or fly mushroom, *A. muscaria*, is common in open woods, wood margins, and roadside places, from early summer until frost. It is 4 to 8 in. tall, with a cap 4 to 6 in. broad. The cap is scaly and brightly colored, usually orange

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yellow to pale yellow. The flesh is yellow just beneath the skin, but the inner flesh is white. The white and scaly stem is bulbous at the base, and bears a soft torn frill or ring close to the top. The gills are white or pale yellow. The specific name, *muscaria*, and the common names are derived from its property of poisoning flies.

The death cup (q.v.), *A. verna*, and related species *A. virosa*, *A. phalloides* and *A. brunneocens*, constitute the most deadly mushrooms known. Most other *Amanita* species are poisonous or suspect. An exception is *A. caesarea*, an edible mushroom popular since Roman times.

Jack-o-lantern, *Clitocybe illudens*, is a saffron-yellow gill mushroom that grows at the bases of decayed stumps. The stem is 3 to 5 in. tall, and the cap is 3 to 5 in. wide. It bears a resemblance in shape to an edible mushroom of the same genus, *C. gigantea*, the short-stem giant *clitocybe*, which has a large cap when mature and is white to tan in color.

Many other mushrooms are generally avoided because, like Satan's mushroom, *Boletus satana*, their edibility is doubtful, or because, like *Ithyphallus impudicus* and the other stinkhorns, they have a disagreeable odor. *Russula emetica*, the so-called emetic mushroom, and its near relatives should be avoided. J.A.S.; P.L.L.

MUSIAL, Stan(ley Frank) (1920–), American baseball player and manager, born in Donora, Pa. He began his baseball career in 1938 as a minor-league pitcher, but injuries to his arm forced him to stop pitching; he then played in the outfield and at first base. With the Saint Louis (Mo.) Cardinals of the National League, for a total of twenty-two years (1941–44; 1946–63), Musial set more records than any other baseball player.

Musial set major-league records for extra-base hits (1377) and total bases (6134). He also set National League records for total number of games played (3026), consecutive games played (895), times at bat (10,972), runs scored (1949), runs batted in (1951), and hits (3630). He won the most valuable player award three times and was the league batting champion seven times. For sixteen consecutive years Musial, a left-handed hitter, achieved a batting average of over .300; he had a lifetime average of .331.

Musial retired from playing in 1963. The following year he was appointed chairman of the President's Council on Physical Fitness by President Lyndon Baines Johnson. Musial returned to baseball as general manager of the St. Louis Cardinals in 1967, and a year later his team won the National League championship. He was elected to the National Baseball Hall of Fame in 1969.

MUSIC, art that uses sounds. For information on sound and sound-producing instruments and on the mechanism of hearing, see **EAR**; **MUSICAL INSTRUMENTS**; **SOUND**; **VOICE AND SPEECH**.

KINDS OF MUSIC

Music falls into several broad nonexclusive categories that are determined by the cultural development of man. Some of these are primitive music, folk music (qq.v.), and art music.

Primitive music consists of the music that exists, in varying degrees of complexity, among the so-called primitive peoples of the world. It has much flexibility in its melodic and rhythmic nuances and in the manner of its performance. It is often used for religious or magical ceremonies and for the dance. Most primitive music is of anonymous composition and is perpetuated by oral tradition rather than by written records.

Folk music is the music that grows up anonymously in cultures that have a developed art music. Like primitive music, folk music is transmitted by oral tradition.

Art music is the music developed in cultures in which various forms of creative expression are practiced in a high state of cultivation. It is usually composed for its own sake, although it can be used as an adjunct to drama and the dance. This article will deal primarily with art music.

THE ELEMENTS OF MUSIC

Composers have an infinite variety of sounds at their disposal. They can use sounds made by the human voice as well as those made with the aid of musical instruments. They can combine these sounds in an infinite number of ways. In practice, however, only a limited number of choices are available to a composer. In different times and places some sounds are always preferred over others, and some methods of combination are always considered more appropriate than others. Some composers may choose to reach beyond the conventions of their own time and place, but they rarely venture far. In fact, the shared limitations on free choice and the shared differences in treating the elements of music give the music of a particular historical period or geographical area its characteristic style. Further refinements in treatment give a distinctive style to the music of an individual composer and may permit the listener to distinguish music written in different periods of the same composer's life.

Sound. The most fundamental element of music is the quality of the sound that one hears at any given moment. The sound might be that of a human voice, a drum, a brass band, or a string quartet. The sound might also be loud or

soft, and it might consist of high or low pitches or of a combination of high and low pitches; see *PITCH*. Almost all listeners are sensitive to these ingredients of sound quality.

Another important characteristic of music is its density. Thirty instruments playing together produce a greater density of sound than do two or three. A high pitch combined with a low pitch produces a density that sounds open or empty when compared with the combination of two pitches in a middle range.

Equally important is the texture of a musical composition. When several independent melodies are combined as in a fugue (q.v.), a contrapuntal texture results; see *COUNTERPOINT*. When a single melody is accompanied by a series of chords, as in a hymn (q.v.), a chordal or homophonic texture results. Many textures, of course, lie between these two extremes. In the 17th and early 18th centuries, for example, the texture of music was largely dominated by two voices, melody and bass, which moved in counterpoint to each other. The space between these voices was filled in with chords. The texture was thus partly contrapuntal and partly homophonic.

Sound also includes the factor of space. A composer may specify that different sounds are to come toward the listener from different directions. These and other ingredients provide the composer with a rich variety of sound qualities that can be joined or contrasted.

Melody. A second fundamental element of music is melody. Composers have often invented tunes that nonmusicians can remember and sing, and many people who would not consider themselves composers have sung or whistled tunes of their own invention. Melody, however, does not always consist of tunes that can be sung. A composition may contain sequences of pitches that are too close together in time or too jagged in outline to be sung. These melodies may require an instrument such as the violin to play them.

Many separate factors make up melody. One is contour. A melody might, for example, rise to a peak near its midpoint and then fall to the level at which it began. The contour of such a melody, when drawn on paper, would resemble a pyramid. The melody might rise to a peak and fall so as to form straight lines, or it might have subsidiary peaks along the way, creating a jagged appearance. If the melody is long, it might be made up of several sections, each with a contour of its own. The possible contours available to a composer are so numerous that any shaped line has probably been duplicated in music.

Another factor in melody is its rhythm (q.v.), which in turn is composed of several ingredients. One ingredient is the rate of speed, which is called the tempo (q.v.). The same melodic contour could serve for both a slow dirge and a fast march; the only difference would be the tempo. Another ingredient is the number of beats within a bar, which is one aspect of the factor called meter. A waltz meter, for instance, is composed of three beats per bar, while a march meter is composed of two beats (or a multiple of two); the same melodic contour could be made to fit either meter. A third ingredient is the surface speed, which results from subdividing beats into shorter time values or combining them into longer, composite time values. Most melodies have changing rates of speed on the surface and a relatively constant tempo and meter underneath.

A third factor in melody is harmony (q.v.), which is also an element in its own right. One of the means by which a composer creates a feeling of tension or repose in various parts of a melody is by emphasizing notes that are outside or within the prevailing harmony (see *Harmony* below); this method was particularly important in the music of the 18th and 19th centuries.

The kind of melody a composer writes, whether it sounds beautiful or ugly or neutral, will depend on the use he intends for it. A beautiful melody, such as one might admire in a song (q.v.), is often unsatisfactory in a long instrumental work in which it has to be played by several different instruments and combined or contrasted with other melodies. Similarly, a melody suitable for use in a symphony (q.v.) might be too disjointed to be effective in a song.

Harmony. When two or more pitches are sounded, either successively as in a melody or simultaneously as in a chord, the listener will usually be aware of several relationships between them. He will notice whether one pitch is higher or lower than another, and he will observe whether one is held for a longer period of time than another. The experienced listener will also tend to add the pitches and to hear them as a unit. This unit will communicate a feeling of tension or repose to the listener, especially when he can compare it with other such units. The element involved here is harmony, which is perhaps the most subtle element in music.

A basic ingredient in harmony is the interval (q.v.), which is the vertical distance between two pitches. Because of the overall musical context in which they appear, some intervals in a composition sound pleasant and others harsh, some stable and others unstable. Intervals thus

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constitute one of the harmonic ingredients that composers can exploit for purposes of musical similarity and contrast or tension and repose.

Partly through their acoustical properties (see HARMONICS) and partly through habits of thought, some tones in any system of harmony come to be considered stable and others unstable. A melody passes through varying degrees of repose and tension as it touches on stable or unstable tones. Sequences of chords have similar properties for the same reason. The ebb and flow of tension in long compositions often results from long-range contrasts in harmony. These contrasts may also lend a feeling of unity or cohesion to a composition by carrying the listener away from a harmonic norm and then returning him to the norm.

In most Western music, especially that of the 18th and 19th centuries, stable and unstable tones are related according to a system of harmony called tonality. Music in other parts of the world is often based on other systems of tension and repose, which are often grouped under the single term modality; see MODE.

Rhythm. A musical composition exists within a portion of time, just as a painting exists within the area of a canvas. The use of time in music, which is called rhythm, is therefore a basic element in the art.

One rudimentary way of using time might be to divide it into short segments of equal length, each marked off by a drum beat. This would produce a strong, regular pulse that would be especially useful if the music were to accompany physical movement such as marching or dancing. In such cases, the composer would probably devise melodies and harmonies that would contribute to the pulse. He could do this by having stable tones always fall on strong beats and unstable tones fall in between. The tempo, or rate of speed, will determine whether the music is slow and somber or fast and lively.

The segments of time into which a composer divides his music do not need to be short or equal in length. They do not have to be coordinated with the positioning of stable and unstable tones in the melody and harmony. Each of these elements can have its own rhythmic organization. The underlying pulse, for example, may remain regular although the melody moves at varying rates of speed. Simultaneously, the rate of chord change, which is called the harmonic rhythm, may move independently according to its own pattern of long and short time values. Although the listener may not be able to separate and analyze all the layers of rhythm in a composition, his interest in the

music and his emotional reactions to it will be affected by these rhythms.

Form. The overall shape of a composition is called its form. Some formal patterns that became popular in the 18th and 19th centuries have proved useful to composers ever since. One of them, often called song form, is a three-part scheme that can be represented by the letters A-B-A. The first and third sections contain the same or similar music, and the second section contains contrasting music. Rondo form follows the pattern A-B-A-C-A-D- and so on. A theme and variations can be represented as A-A'-A''-A'''- and so on. The distinctive character of each section in such schemes can be established on more than one level. Any facet of sound, melody, harmony, and rhythm can be manipulated by the composer. All these elements, together with the harmonic system of tonality, were combined by composers in the late 18th century to produce an intricate scheme of organization called sonata form; see SONATA: *Sonata Form*. Because sonata form enabled composers to coordinate musical elements on several levels over long spans of time, it stands as one of the great intellectual achievements of Western man.

The shape of a musical composition cannot always be diagrammed with letters. Several different rhythmic and melodic patterns may be in operation simultaneously. In terms of sound, a series of episodes might occur, and each episode might have a different quality resulting from different instruments, densities, levels of volume, and the like. On this level, a scheme A-B-C-D-E- and so on would prevail. A skilled composer works with many disparate ideas.

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Although an isolated cuneiform example of Hurrian (see HITTITES) music of the 2nd millennium B.C. was deciphered and performed recently, the earliest music known is that of the ancient Greeks and Romans, from about 500 B.C. to 300 A.D. Fewer than a dozen examples of the latter survive. Greek and Roman theories of the nature and function of music, however, are discussed at length in the writings of such philosophers as Aristotle, Boethius, Plato, and Pythagoras (qq.v.). These writers believed that music originated with the god Apollo, the mythological musician Orpheus (qq.v.), and other divinities, and that music reflected in microcosm the laws of harmony that rule the universe. They believed, furthermore, that music influences human thoughts and actions.

Greek music was primarily monophonic, or limited to one melody at a time sung or played



Assyrian musicians with their instruments, relief from the Palace of Ashurbanipal at Nineveh, part of present-day Mosul, Iraq.

Metropolitan Museum of Art—Crosby Brown Collection of Musical Instruments

without accompaniment. Occasionally, one or more musicians in an ensemble might play a variant of the melody while other musicians were playing its original version. This produced a somewhat more complex musical texture called heterophony.

The rhythm of Greek music was closely associated with language. In a song, the music duplicated the rhythms of the text. In an instrumental piece it followed the rhythmic patterns of the various poetic feet; see **VERSIFICATION**. The internal structure of Greek music was based on a system of modes that combined a scale with special melodic contours and rhythmic patterns. A similar organization exists today in Arabic music and Indian music (qq.v.). Because each Greek mode incorporated rhythmic and melodic characteristics, listeners could distinguish between them. Greek philosophers wrote that each mode possessed an emotional quality and that listeners would experience this quality on hearing a composition in that mode. Today, without further knowledge of the music itself, no one can say whether this idea was true in human experience or was only a theory. It may have been both to some degree.

The most common Greek instruments were the kithara, a string instrument associated with Apollo, and the aulos, a wind instrument associated with the god Dionysus (q.v.). The former instrument was said to have had a calming or uplifting effect on listeners, and the latter was said to have communicated excitement. These

instruments were used in religious ceremonies as well as in the theater, where they accompanied the performance of Greek dramas. Instrumental playing reached its apex around 300 B.C., when many musicians participated in contests.

The Romans seem to have carried on the Greek musical traditions and to have contributed little of their own. They did develop some brass instruments, however, which they used in battle and in military processions. They also invented the hydraulis, an organ with a hydraulic pressure stabilizer. See **GREECE: Ancient Greece**; **GREEK MUSIC**; **ROME, HISTORY OF**.

The Early Middle Ages. In the Middle Ages (q.v.) most professional musicians were employed by the Christian Church. Because the Church was opposed to the paganism associated with ancient Greece and Rome, it did not encourage performances of Greek and Roman music. Consequently, this music died out.

Little is known of the unaccompanied chant (q.v.) that was used in services of the early Christian Church. Christian chant appears, however, to have been drawn from the ritual music of the Jewish synagogue (see **JEWISH MUSIC**) and from secular tunes of the time. The chant melo-

Lyre player, from a 5th-century Greek vase painting.

Boston Museum of Fine Arts



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dies that developed in Rome were inventoried and assigned specific places in Church ceremonies during the period from the 5th to the 7th centuries. Roman chant became known as Gregorian chant after Pope Gregory I, the Great (see under GREGORY), who may have composed some of the melodies and who actively encouraged an orderly, ritualized use of music by the Church. Because Gregory and later popes preferred Gregorian chant to the varieties that had developed elsewhere in Europe, Gregorian chant eventually superseded most of the others. Gregorian and other chant styles are preserved in many manuscripts. The musical signs used in these manuscripts, called neumes, are the earliest roots of modern musical notation (q.v.).

Romanesque and Early Gothic Music. About the 9th century many musicians began to feel the need for a more elaborate music than unaccompanied melody. They began to add an extra voice part to be sung simultaneously with sections of the chant. The musical style that resulted is called organum. Organum was important in the history of music because it was the first step toward the development of the musical style known as polyphony (q.v.), the extensive use of which is the most distinctive feature of Western music.

By the end of the 12th century, three- and four-voice parts were being added to chant melodies, forming long works that could fill the vast spaces of Gothic cathedrals with large quantities of sound. The principal centers in the development of organum were in France, at the Abbey of Saint Martial in Limoges and at the Cathedral of Notre Dame in Paris. An English version of organum, called gymel, also developed during this period. See also ENGLISH MUSIC; FRENCH MUSIC; RELIGIOUS MUSIC.

In order for musicians to be able to read and perform several different voice parts simultaneously, a precise system of musical notation had to be developed. The notation of pitch was solved by the use of a musical staff of four, five, or more lines with each line or space representing a specific pitch as in present-day notation. The perfection of this system is attributed to the Italian Benedictine monk Guido d'Arezzo. Time values proved to be more difficult to notate. The solution that evolved in the 11th and 12th centuries was based on a group of short rhythmic patterns called rhythmic modes. The same pattern, or mode, was repeated over and over until the composer indicated by a sign in the notation that another rhythmic mode was to supersede it. Variety of rhythmic movement was achieved by employing different modes si-

multaneously in different voice parts and by changing modes during the course of a composition. The notation devised to indicate the rhythmic modes is called Franconian, after its principal advocate, the 11th- or 12th-century writer Franco of Cologne.

Organum was a sophisticated musical development that was encouraged and appreciated primarily by the educated clerics in the Christian Church. A secular musical tradition, simpler in makeup, existed outside the Church. This was the monophonic music of itinerant musicians, the jongleurs and their successors, the troubadours and trouvères (qq.v.) of France and the minnesingers (q.v.) of Germany. See FRENCH MUSIC; GERMAN MUSIC.

Both sacred and secular music used a wide variety of instruments, including such string devices as the lyre and psaltery and the vielle, an ancestor of the violin. Keyboard instruments included the organ. Percussion instruments included drums and small bells.

Late Gothic Music. A major stylistic change occurred in music during the early 14th century. The new style was called *ars nova* (Lat., "new art") by one of its leading composers, the French prelate Philippe de Vitry (1290?-1361). The resulting music was more complex than any previously written, reflecting a new spirit in Europe that emphasized human resourcefulness and ingenuity. De Vitry also invented a system that included time signatures. This allowed musicians of the 14th century to achieve a

Court minstrels with (left) a fiddle and (right) a cross flute, from a 14th-century German manuscript. Then a four-stringed instrument, the fiddle was the most popular instrument in medieval times.

Metropolitan Museum of Art



new rhythmic freedom in their compositions.

The new complexities took several forms. Expanding on the principle of short rhythmic modes, composers of *ars nova* used rhythmic patterns of a dozen or more notes, which they repeated over and over in one or more voice parts of a composition. The new principle is called *isorhythm* (Gr. *iso*, "same"). Composers used an isorhythmically organized voice part as the foundation for large works and wove other melodies over it to produce intricate polyphonic designs. The foundation voice was usually taken over from a portion of Gregorian chant. This borrowed melody was known as the *cantus firmus* (Lat., "fixed melody"). The musical genre in which composers used the isorhythmic principle to the greatest extent was the motet (q.v.). Some motets, in addition to complexities of structure, contained several texts sung simultaneously.

A second complexity of *ars nova* concerned the overall structure of music written for the Mass (q.v.). Before 1300 polyphonic settings had sometimes been written for separate sections of the Mass. In the 14th century, for the first time, all five sections that make up the Ordinary of the Mass were treated as a unit with shared melodic relationships. The first person to do this was the French cleric, poet, and composer Guillaume de Machaut (1300?-77?). His example, however, was not followed until the next century.

A distinctive feature of the *ars nova* was the increased attention given to secular music. For the first time the major composers of the period wrote secular as well as sacred music. The unaccompanied melodies that had been sung in the 13th century by the troubadours and trouvères were expanded by 14th-century composers into two- and three-voice pieces called *chansons* (Fr., "songs"). The patterns of line repetition in the texts for these chansons determined the overall form of the music. The most commonly used schemes in France were the *rondeau* (q.v.), the *virelai*, and the *ballade*. In Italy the *madrigal* (q.v.), the *caccia*, and the *ballata* were the preferred types. The foremost Italian composer of the period was Francesco Landino (1325-97).

The Renaissance. Reacting against the complexities of the *ars nova*, most early 15th-century composers preferred a simpler style of music with smoothly flowing melodies and less emphasis on counterpoint. The first major impetus toward a simpler style came from the English composer John Dunstable (1370?-1453). The graceful aspects of Dunstable's style were soon adopted by composers on the continent of Eu-

rope, especially by those employed by the dukes of Burgundy in northeastern France. These Burgundian composers were noted for their chansons in which one voice part acted as a principal melody and one or two other parts served as an accompaniment. The Burgundians also developed the practice, begun by Machaut, of composing unified settings of the Ordinary of the Mass. As a result of their activities, the Mass became a monumental genre comparable in scope to the symphonies of the 19th century. Masses that used a *cantus firmus* were often based on chansons or other secular melodies rather than on Gregorian chant. This fact reflected the increasing influence of secular interests during the Renaissance (q.v.).

In writing contrapuntal music Renaissance composers relied heavily on imitation, the successive, closely spaced restatement in one or more voice parts of the same melodic idea. The technique of imitation had been in use since the late 14th century, but during the Renaissance it became a principal structural element in music. If one voice part imitated another consistently for a relatively long span of time, the two voices formed a canon (q.v.). Pairs of voices in Renaissance music sometimes moved in canon throughout an entire piece or section while shorter imitations were occurring among the other voice parts.

The most versatile early Renaissance composer was Guillaume Dufay. He wrote motets that approached the complexity of the style of *ars nova* as well as chansons and other works in the newer, lighter manner. The outstanding composer of chansons was Gilles Binchois (1400?-60?).

The influence of Burgundian composers declined by the mid-15th century. From about 1450 until about 1550 most of the important musical posts in Europe were held by composers born in the present-day regions of Holland, Belgium, and the adjoining French territories. These composers are often called *Netherlanders* after the name of their native region.

In general the Netherlanders preferred a homogeneous sound such as is made by an unaccompanied chorus. The predominant texture of their music was contrapuntal, with all voice parts equal in importance. These musical features contrasted with the typical Burgundian sound in which each voice part had its own color (for instance, a solo voice accompanied by two different solo instruments) and in which one voice dominated the others.

The Netherlanders continued the Burgundian



Miniature painting of musicians, possibly including the Flemish composer Jean d'Okeghem, at a music lectern (from a French manuscript of the late 15th or early 16th century).

tradition of composing chansons, motets, and Masses. Although many excellent Masses were composed in the late 15th and 16th centuries, the Mass was not as exciting a challenge then as it had been to the Burgundians. The basic techniques for unifying an entire Mass had become the common property of all composers, and Mass texts, which always remain the same, suggested fewer new kinds of musical setting. Largely for these reasons, the motet became the vehicle for experimentation. The texts, drawn from all parts of the Bible as well as from other sources, evoked many illustrative musical ideas from composers. Chansons of the 16th century moved away from the simple charm of the Burgundian love songs. They tended either to be elaborately contrapuntal or else filled with witty musical allusions to bird calls, the cries of street vendors, and so forth. The chansons of the Parisian composers Claudin de Sermisy (1490?–1562) and Clément Janequin (1485?–1560?) are representative of the latter style.

The leading Netherlands were Jean d'Okeghem (1430–95), Jakob Obrecht (1452–1505), Josquin des Prez (1450–1520), and Orlando di Lasso (1530?–94). Among the most prominent Italian musicians of the period was Giovanni Palestrina. His music typifies the even flow of choral

polyphony that was the chief ideal of the Renaissance musical style. Other noted musicians of the time included the English organist and composer William Byrd and the Spanish composer Tomás Luis de Victoria (1549?–1611). Important to the growth of music was the development of techniques for printing musical compositions. First devised about 1500 by the Venetian printer Ottaviano dei Petrucci (1466–1539), such techniques were soon in use in Antwerp, Nuremberg, Paris, and Rome.

The Baroque Era. In the late 16th century, when Renaissance polyphony was prevalent, new developments in Italy were beginning to change the sound and structure of music. Many Italian musicians disliked the polyphonic style of the Netherlands. They favored less intricate music, marked by frequent emotional contrasts, a readily understandable text, and an interplay of various voices and instruments. Such elements became especially prominent in opera (q.v.), a genre first performed in Florence at the end of the 16th century and greatly developed by the 17th-century Italian composer Claudio Monteverdi. Other 17th-century innovations in vocal music included the cantata and the oratorio (qq.v.).

Instrumental music also became increasingly prominent during the 17th century, often in the form of a continuous contrapuntal work with no clear-cut divisions into sections or movements; it bore such names as *ricercare*, *fantasia*, and *fancy*. A second type of composition was made up of contrasting sections, usually in both homophonic and contrapuntal textures; this type was known as the *canzona* or *sonata*. Many instrumental pieces were based on an already existing melody or bass line; they included the *partita*, *theme and variations*, *passacaglia*, *chaconne*, and *chorale prelude*. Pieces in dance rhythms were often grouped together into *suites*; see *SUITE*. Finally, composers developed pieces in improvisatory styles for keyboard instruments; these pieces were called *preludes*, *toccatas*, and *fantasias*.

With the rise of new genres in the 17th century some of the basic concepts of musical structure were transformed, especially in Italy. Instead of writing pieces in which all voices from soprano to bass participated equally in the musical activity, composers concentrated on the soprano and bass parts and merely filled in the remaining musical space with chords. The exact spacing of the chords was unimportant, and composers often allowed a keyboard player to improvise them. The terms "thorough bass", "basso continuo", and "figured bass" refer to



The 18th-century Italian composer Alessandro Scarlatti playing the clavichord, or harpsichord, among a group of friends in a chamber music recital.

Bettmann Archive

the bass line and the chordal filling, which formed a texture used in all types of music, particularly in solo songs.

Another important 17th-century innovation changed the fluid style of much late Renaissance music into one marked by numerous contrasting elements; it was known variously as *concertato*, *concertate*, and *concerto* (q.v.), from *concertare* (Lat., "to struggle side by side"). The contrasts occurred on many musical levels: contrasting instruments or contrasting densities of sound, such as a single instrument opposed by a group of instruments; contrasting rates of speed; contrasting degrees of loudness; and so forth. These contrasting features were made to compete or alternate with each other in order to produce an aggressive, excited musical style, which was applied to music for all instruments as well as for the voice, and was used in all forms and genres.

The outstanding 17th-century composers included the Italians Arcangelo Corelli, Alessandro Scarlatti, Domenico Scarlatti, and Antonio Vivaldi; the Germans Dietrich Buxtehude and Heinrich Schütz (1585–1672); the Englishman Henry Purcell; the Italian-Frenchman Jean-Baptiste Lully; and the Frenchman Jean Philippe Rameau.

Toward the end of the 17th century, the system of harmonic relationships called tonality began to dominate music. This development gave music an undercurrent of long-range relationships that helped to smooth out some of the abruptness of contrasts in the earlier baroque

style. By the early 18th century composers had gained a firm control over the complex forces of tonality. By this time, too, they had largely abandoned the idea of frequent shifts in mood and had begun to favor a more moderate and unified approach. Often an entire piece or movement was an elaboration of one emotional quality, called an *affect*. The control over tonality and the emphasis on single moods were largely responsible for the feeling of security and inevitability in the music of this time, including that of the two greatest late baroque German composers, Johann Sebastian Bach and George Frederick Handel.

Preclassic and Classic Periods. Beginning around 1720 new developments once again began to undermine the prevailing musical style of late baroque music. Younger musicians found baroque counterpoint too rigid and intellectual; they preferred a more spontaneous musical expression. In addition, the late baroque ideal of establishing a single emotional quality and maintaining it throughout a composition seemed constricting to these younger men.

The reaction against baroque style took different forms in France, Germany, and Italy. In France the new current, often called *rococo* or *style galant* (Fr., "courtly style"), was represented by the French composer Francois Cou-

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perin. This style emphasized the homophonic texture of a melody with accompaniment. The melody was ornamented with embellishments such as short trills. Instead of an uninterrupted stream of music, as in a baroque fugue, French composers wrote pieces consisting of combinations of separate phrases, as in music for dance. The typical composition was short and programmatic, that is, it portrayed nonmusical images such as birds, windmills, and the like. The harpsichord (q.v.) was the most popular instrument, and many suites were written for it.

In northern Germany the preclassic style was called *empfindsamer Stil* (Ger., "sensitive style"). It encompassed a wider range of contrasting emotions than the style *galant*, which tended to be merely pleasant. German composers usually wrote longer compositions than the French and used a variety of purely musical techniques to unify their pieces. They did not rely on nonmusical images as did the French. The Germans thus played a significant role in the development of abstract forms, such as sonata form, and in the development of large instrumental genres, such as concerto, sonata, and symphony.

In Italy the preclassic style did not have a special name, perhaps because it did not break sharply with music of the immediate past. Italian composers, however, contributed a great deal to the development of new genres, especially to the symphony. The Italian opera overture, often called a *sinfonia*, usually had no musical or dramatic connection with the opera it introduced. Italian musicians sometimes played opera overtures in concerts, and composers eventually began to write independent instrumental pieces following the format of the overture. This format consisted of three movements, the first and last in fast tempos, and the middle one in a slow tempo. Within each movement the progression of musical ideas usually followed a pattern that eventually evolved into sonata form.

Once Italian composers had established the idea of writing an independent instrumental *sinfonia*, the Germans took over the idea and applied much intellectual ingenuity to it. The principal German centers of activity were at Berlin, Mannheim, and Vienna. Largely as a result of German activities, differentiated musical forms, genres, and media arose. A distinction was made between the medium of chamber music (q.v.), in which one instrument plays each part, and the medium of symphonic music, in which several instruments play each part. It became apparent that chamber music could effec-

tively incorporate large numbers of subtle musical details whereas symphonic music was better suited to broad and sweeping gestures. Within the category of chamber music, composers began to distinguish among several media, such as the string quartet, the string trio, and the keyboard sonata with violin obbligato. For the orchestral medium, composers began to write not only symphonies but also concertos for solo instrument and orchestra.

The symphony, sonata, concerto, and string quartet all followed similar formal outlines. They were in three or four movements, one or more of which was in sonata form.

Sonata form itself arose in the mid-18th century. This form grew out of the now firm control of tonality; that is, it exploited the complex web of harmonic relationships between separate tones and between different keys. Sonata form was based on a movement away from and back to a principal key. To this was added the statement opposing themes at the outset of a movement and the elaboration or separate development of one or all later on.

The climax of 18th-century musical development came at the end of the century in the music of a group of composers known as the Viennese Classic School. The most important Viennese composers were Joseph Haydn, Wolfgang Amadeus Mozart, and Ludwig van Beethoven.

Opera in the 18th century also underwent many changes. In Italy, where it was born, opera had lost most of its original character as a drama with music. Instead it had become a series of arias designed to display the talents of singers; see *ARIA*. Several European composers reintroduced instrumental interludes and accompaniments as an important element. They made greater use of choral singing and introduced greater variety into the forms and styles of the arias. They also tried to combine groups of recitatives, arias, duets, choruses, and instrumental sections into unified scenes. The most important reformer was the Bavarian-born Christoph Willibald Gluck, whose most influential operas were written in Vienna and Paris from 1764 to 1779. Opera in the classic period climaxed in the stage works of Mozart, in which every aspect of the vocal and instrumental lines contributes to the plot development and characterization.

The Romantic Era. At the beginning of the 19th century, the Viennese classical style as exemplified in Haydn, Mozart, and Beethoven prevailed throughout Europe. This style provided so satisfactory a means for achieving the musical goals of the time that almost every com-

poser wrote in some variation of it. The style tended to become a mere formula in the hands of less skilled composers. Partly for this reason, experimenting musicians between 1810 and 1820 gradually began to reach out in new directions.

The more adventurous musicians no longer felt that it was essential to coordinate all elements in their music so as to maintain clear formal outlines. They began to value other musical goals more than the goal of formal clarity. Instead of moderation, they began to value such qualities as impulsiveness and novelty. They might, for instance, write an unusual progression of chords although the progression did not contribute to the overall harmonic direction of a composition. Similarly, if the sound of a particular instrument seemed especially attractive during the course of a symphony, they might write a long solo passage for this instrument, although the solo distended the shape of the symphony. In this and other ways 19th-century composers began to exhibit a Romantic as opposed to a classic view of their art; see CLASSICISM; ROMANTICISM. The aesthetic goals of Romanticism were especially valued in Germany and central Europe. The instrumental works of the Austrian composer Franz Peter Schubert and the piano music and operas of the German Karl Maria von Weber were an early manifestation of this development in music.

The Romantic composers were often inspired by literary, pictorial, and other nonmusical sources. Consequently, program music (q.v.), or music that follows a nonmusical plan, was widely cultivated, leading to the development of the symphonic poem (q.v.). The French com-

poser Louis Hector Berlioz and the Hungarian composer Franz Liszt became especially prominent in this genre. Poetry of the 18th and 19th centuries formed the basis of art songs in which the composer portrayed with music the imagery and moods of the texts. The German art song is known by its German name, *lied*. Many hundreds of *lieder* were composed in the 19th century, the most successful being written by Schubert, Robert Schumann, Johannes Brahms, Hugo Wolf, and Richard Strauss.

The ideal 19th-century genre was opera. Here, all the arts were joined together to produce grand spectacles, highly charged emotional situations, and opportunities for spectacular singing. In France Gasparo Spontini (1774-1851) and Giacomo Meyerbeer established the style called grand opera. Another Frenchman, Jacques Offenbach, developed a comic-opera style called *opéra bouffe*. Other important French opera composers were Charles François Gounod and Georges Bizet. In Italy Gioacchino Antonio Rossini, Gaetano Donizetti, and Vincenzo Bellini continued the 18th-century Italian tradition of *bel canto* (It., "beautiful singing"). In Italy during the second half of the century, Giuseppe Verdi tempered the emphasis on *bel canto* by stressing the dramatic values inherent in human relationships and sentimental love and violent emotions were stressed by Giacomo Puccini. In Germany, Richard Wagner developed an opera style called music drama, in which all aspects of a work contributed to the central dramatic or philosophical purpose. Unlike Verdi, who stressed human values, Wagner was usually more concerned with legend, mythology, and such concepts as redemption. Wagner devel-

A notice for a performance (1861) of the opera *Tannhäuser*, by the German composer Richard Wagner, at the Imperial Opera Theatre, Paris.

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Les Bureaux de location, rue de la Harpe, vis-à-vis de la rue de la Harpe, vis-à-vis de la rue de la Harpe, vis-à-vis de la rue de la Harpe.

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oped the use of short fragments of melody and harmony, called *leitmotifs* (Ger., "leading motives"), to represent people, objects, concepts, and so on. These fragments were repeated in the vocal or orchestral parts whenever the thing they represented recurred in the actions or thoughts of the characters.

During the 19th century a tradition of abstract, or nonrepresentational, music was maintained in symphonies and chamber music. Schubert, Schumann, Brahms, the German composer Felix Mendelssohn, and the Austrian composer Anton Bruckner were especially important in this regard. The Russian composer Pëtr Ilich Tchaikovsky wrote symphonic and chamber works as well as operas and program music. Works without programs but with freely devised forms were written for the piano by the Polish composer Frédéric François Chopin.

In all musical genres, a high value was placed on uniqueness of expression. This gave rise not only to widely differing personal styles of composition but to personality cults of virtuoso performers and conductors. Two of the best known were Liszt and the Italian violinist Nicolò Paganini. The Austrian conductor and composer Gustav Mahler wrote symphonies that incorporated references to his personal life.

By the end of the century the Romantic style had modified the language of music in several ways. The taste for unusual chord progressions had brought about a disintegration of tonality. Composers, especially Wagner, made increasing use of chromaticism, a harmonic style with a high proportion of tones outside the prevailing key. Folk music idioms became widespread, particularly on the part of composers from Russia, Czechoslovakia, Norway, and Spain. Among these composers were the Russians Mikhail Ivanovich Glinka, Modest Petrovich Musorgski, and Nikolai Andreevich Rimski-Korsakov; the Czechs Anton Dvořák and Bedřich Smetana; and the Norwegian Edvard Grieg. Later composers who made use of folk elements included the American Louis Moreau Gottschalk, the Danish Carl August Nielsen (1865–1931), the Finnish Jean Sibelius, and the Spanish Manuel de Falla.

These folk idioms, along with others discovered at the beginning of the 20th century, reintroduced into art music many older concepts of harmony and rhythm. The same effect resulted from systematic researches into the history of music, which were begun in the 19th century. With the disintegration of tonality, cohesion in a piece of music was less and less dependent on harmonic movement and more and more de-

pendent on the ebb and flow of intensities and densities of sound. The use of sound as a structural element in music was one characteristic of the late Romantic French style called impressionism (q.v.), which was developed by the French composers Claude (Achille) Debussy and Maurice (Joseph) Ravel. Other French composers worked in a more satirical style; these included Francis Poulenc and Erik Satie.

The 20th Century. The high value placed on individuality and personal expression in the Romantic Era has grown even more pronounced in the 20th century. This is partly the result of several features of 20th-century life. In this era more people from more social and geographic backgrounds than ever before have been able to study music and develop their aptitude for composition. An enormous range of tastes and skills has thus become a feature of modern composition. Radios and recordings bring music from once-remote countries in South America and the Far East to the attention of musicians in all parts of the world. The speed of modern communications makes it possible for listeners to evaluate innovations more quickly than ever before. The result of these features is that originality is more highly valued than in any previous era, and that diversity and rapid change have become the most prominent general features of 20th-century music.

Several styles that have played a significant role during the century have names that refer to their harmonic characteristics. Chromaticism, described above in connection with the Romantic Era, has continued to be a prominent feature of harmony in the 20th century. In the first decade of the century, largely as a result of extreme chromaticism, atonality, or the complete absence of tonality, occurred in the music of a few composers. The most notable atonal composer of that time was the Austrian Arnold Schönberg.

In the early 1920's Schönberg devised the twelve-tone method of writing atonal music. In this method, the twelve tones into which the octave (q.v.) is divided are placed in a row following any order of the composer's choosing. The composer then adheres to this succession, or a variation of it, as he writes. He may combine several successive tones into chords and thus avoid merely repeating the entire row as a melodic line. Schönberg developed the twelve-tone method partly to prevent himself from unconsciously slipping back into tonal patterns of thought and partly to enable himself to organize large spans of atonal music in a coherent manner. At first, Schönberg's pupils, such as the Aus-



Russian-American composer Igor Fëdorovich Stravinsky conducting a performance of one of his own compositions.

trian composers Alban Berg and Anton von Webern, were the only composers who adopted his technique. Within thirty to forty years of its appearance, however, most major composers of the 20th century had used the method.

The other harmonic styles in 20th-century music include polytonality, or the simultaneous use of more than one tonality, and modality, or the use of modes and scales from the Renaissance and earlier. The Hungarian composer Béla Bartók based much of his harmonic style on the modes of old Hungarian folk music.

Microtonal music, another 20th-century innovation, is also based on a harmonic concept. In microtonal music, however, the octave has been divided into more than the usual twelve tones, which means that some of the tones, the so-called microtones, sound slightly sharp or flat when compared with the tones of a normal Western scale.

Neoclassicism, which developed in the 1920's,

is a comprehensive style involving more than harmonic features. It marked a return to the classic concept that all elements in a composition should contribute to the clarity of the overall structure or form. Neoclassicism included the use of a modified sense of tonality, usually enlivened with a large amount of chromaticism, and the use of formal schemes from the baroque and classic eras. The most prominent representatives of neoclassicism were the Russian-born Igor Fëdorovich Stravinsky and the German-born Paul Hindemith. Others included the Russians Sergei Sergeevich Prokofiev and Dimitri Dimitrievich Shostakovich. Many American composers have embraced the principles of neoclassicism, largely as a result of their years of study in Paris, with the French composer-teacher Nadia Boulanger. These Americans include Elliott Carter (1908–), Aaron Copland, Walter Piston, and Virgil Thomson.

Beginning in 1948, the French engineer and composer Pierre Schaeffer (1910–) and a few other composers in Paris began to record sounds such as street noises and to combine them in various ways. They called the result *musique concrète* (Fr., "concrete music") because their music consisted of sounds from everyday life rather than abstract and artificial sounds as produced by musical instruments. *Musique concrète* marked the beginning of electronic music, in which electronic equipment, including computers, is used to generate sounds, modify them, and combine them with each other. By the late 1960's there were many hundreds of studios in all parts of the world which had been equipped with electronic equipment for composers to use.

Two other innovations in 20th-century music are serialism and indeterminacy, or chance. Serialism is based on the principle of the twelve-tone method. An order of succession is established for rhythmic values, for levels of loudness, for example, as well as for pitches. All of these so-called rows are then repeated during the course of the work. The technique is sometimes called total serialism to distinguish it from the limited serialism involved in the twelve-tone method. The serial composers have included the Frenchmen Olivier Messiaen (1908–) and his pupil Pierre Boulez, the German Karlheinz Stockhausen (1928–), the Austrian Ernst Křenek, and the American Milton Babbitt (1916–).

Music involving indeterminacy leaves some aspect of the music to chance. The role of chance may take many different forms. For instance, during the process of composition the

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composer might base some of his choices of sounds on the outcome of a game of dice or cards. The composer might write several pages of music and let the performer choose which pages he will play and the order in which he will play them. Instead of writing music, the composer might prepare a design of lines and shapes and ask the performer to devise some combinations of sounds that will be equivalent to the design. The composers who use one or more indeterminate procedures have included many Americans, especially John Cage (1912–) and Earle Brown (1926–). More recently, the Argentine composer Alberto Ginastera (1916–) and the Greek composer Iannis Xenakis (1922–) have successfully incorporated indeterminate elements into their music, as have other European, Eastern, and Latin American composers. Most composers in the 1960's employed combinations of all the techniques mentioned.

Opera has suffered in the 20th century from rising labor costs and declining subsidies, which were generously provided in previous centuries from royal and state treasuries. The genre nevertheless remains so attractive that only a handful of important 20th-century composers have not written at least one opera. The 20th-century composers whose operas are most widely performed are the German composers Richard Strauss and Hans Werner Henze (1926–), and the British composer Benjamin Britten. Music for the dance, previously neglected by most major composers except Tchaikovsky, began to receive the attention of most 20th-century composers, especially Prokofiev, Ravel, and Stravinsky; see BALLET.

Although music in the 20th century seems to encompass a bewildering variety of procedures and approaches, one feature has emerged since 1950 as a common factor in most progressive works. This is the emphasis on sounds, their qualities, textures, densities, and durations. For the first time in the history of music, this element in music has begun to take precedence over all others, including melody, which may not be present at all, and harmony, which may be treated merely as one component in a series of sound-complexes.

See separate articles on the music of various countries, as AMERICAN MUSIC, and on the individual composers for whom birth and death dates are not given. N.L.

MUSICAL OR MUSICAL COMEDY, type of theatrical production in which songs and choruses, instrumental accompaniments and interludes, and often dance are integrated into a dra-

matic plot. The genre developed and was refined in the United States, particularly in the theaters along Broadway in New York City, during the first half of the 20th century. The musical has origins in a variety of 19th-century theatrical sources, including the operetta, comic opera, pantomime, minstrel show, vaudeville, and burlesque. (See separate articles on each of these genres.)

The native American musical actually began as early as 1786, with *The Archers*, or *The Mountaineers of Switzerland*, by Benjamin Carr, composer, and William Dunlap, librettist. *The Black Crook*, produced in 1866, is generally credited as the first "musical"; actually it was an extravaganza, combining melodrama with ballet. In the late 19th century, operettas from Vienna, London, and Paris (composed by Johann Strauss, Jr., and Franz Lehar, by Sir Arthur Sullivan, and by Jacques Offenbach) were popular with New York City audiences. At the same time, revues (plotless programs of songs, dances, and comedy sketches) abounded not only in theaters but also in some upper-class saloons, such as the music hall operated by the comedy team of Joe Weber and Lew Fields. The successful shows of another comedy team, Ned Harrigan and Tony Hart, were also revues, but with connecting dialogue and continuing characters. These in turn spawned the musical shows of producer-playwright-actor-songwriter George M. Cohan, the first of which appeared in 1901.

In the years prior to World War I, several young operetta composers emigrated from Europe to the U.S. Among them were Victor Herbert, Sigmund Romberg, and Rudolf Friml. Herbert's *Naughty Marietta* (1910), Friml's *The Firefly* (1912), and Romberg's *Maytime* (1917) are representative of the new genre these men created: American operetta, with simple music and librettos and singable songs that were enduringly popular with the public.

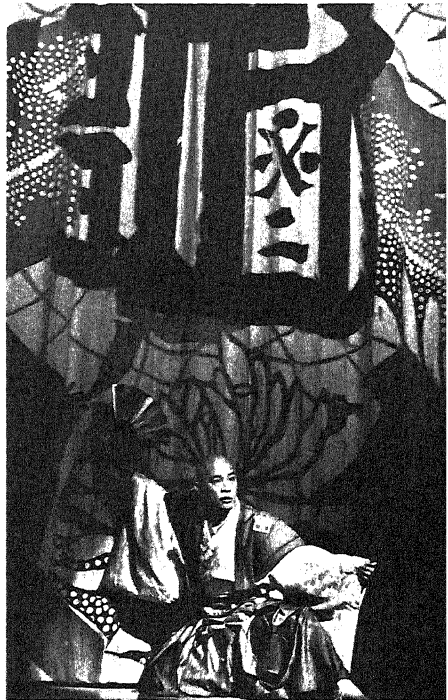
In 1914 the composer Jerome Kern began to produce a series of shows in which all the varied elements of a musical were integrated into a single fabric. Produced in the intimate Princess Theatre, they used contemporary settings and events, in contrast to operettas, which always took place in fantasy lands. In 1927 Kern provided the score for another production, *Show Boat*, which had the first serious libretto; it was adapted from a successful novel—a technique that was to proliferate in the post-1940 musicals.

Gradually the formula was being broken. The early musical comedies had to have two couples (one romantic, one comic), separate singing and

dancing choruses of carefully paired pretty girls and handsome boys, and a complicated but never serious plot. As the musical comedy developed into the musical, several important changes occurred. Literate lyrics and simplified librettos were introduced; underscoring (music played as background to dialogue or movement) was added; and new American musical forms, such as jazz and blues, were utilized by composers. In addition, singers began to learn how to act. In 1932, *Of Thee I Sing* became the first musical to be awarded a Pulitzer Prize in drama. Its composer and lyricist, the brothers George and Ira Gershwin, had intelligently satirized contemporary political situations in their words and music.

In the 1920's, satire, ideas, and wit had been the province of the intimate revue. These sophisticated shows were important as testing grounds for the young composers and lyricists who later helped develop the serious musical. One composer-lyricist pair who started in the intimate revues, Richard Rodgers and Lorenz Hart, wrote a show in 1940 that had many of the elements of the later musicals, including a book with three-dimensional characters. But *Pal Joey* was not a success until its 1952 revival. In the meantime Rodgers, with Oscar Hammerstein, 2nd, as his new collaborator, had produced *Oklahoma!* (1943), which had ballets, choreographed by Agnes De Mille, that were an integral part of the plot. (The choreographer-director was eventually to become vastly influential on the shape and substance of the American musical. Jerome Robbins, Michael Kidd, Bob Fosse, and Michael Bennett are notable among the skilled choreographers who went on to create important musicals.)

As these and other innovations altered the familiar face of musical theater, audiences came to expect more variety and complexity in their shows; a host of inventive composers and lyricists obliged. In 1949, Cole Porter, who had written provocative songs with brilliant lyrics for many years, finally wrote a show with an equally fine book: *Kiss Me Kate*. Rodgers and Hammerstein followed *Oklahoma!* with *Carousel* (1945) and *South Pacific* (1949). Irving Berlin, who had been writing hit songs since 1911, produced the popular but somewhat old-fashioned *Annie Get Your Gun* (1946). Frank Loesser provided both words and music for *Guys and Dolls* (1950), with its raffish Damon Runyon characters. *Brigadoon* (1947) was the first successful collaboration of the composer Frederick Loewe and book-and-lyric writer Alan Jay Lerner, who were later to contribute *My Fair Lady* (1956),



Mako in a scene from *Pacific Overtures*, a musical about Japan that won the 1976 New York Critics Award. Music and lyrics were by Stephen Sondheim.

Van Williams

based on George Bernard Shaw's *Pygmalion*.

Among the composers who came into prominence during the 1950's was Leonard Bernstein, who wrote the scores for *Candide* (1956) and *West Side Story* (1957). The latter, a modern adaptation of *Romeo and Juliet* that was mostly danced and heavily underscored, was enormously influential. Another major figure of the 1950's was Jule Styne, who wrote the music for such shows as *Bells are Ringing* (1956) and *Gypsy* (1959). In the 1960's and 1970's appeared John Kander and Fred Ebb, composer and lyricist of *Cabaret* (1966); Sheldon Harnick (music) and Jerry Bock (lyrics), of *Fiddler on the Roof* (1964); and Stephen Sondheim, who wrote the lyrics for *West Side Story* and *Gypsy* and the entire scores for a series of innovative musicals including *Company* (1970), *Follies* (1971), and *A Little Night Music* (1973). A show that opened on Broadway in 1968 and went on to affect world theater was *Hair*. Called a folk-rock musical, it

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had a situation rather than a plot, and its lyrics, as performed, were often unintelligible. But its youthful exuberance, ingenious theatricality, and concentration on rock music produced a long list of imitators. A few of these succeeded, notably *Godspell* and *Jesus Christ Superstar* (both 1971).

See separate articles on most of the individuals mentioned. L.E.

MUSICAL INSTRUMENTS, contrivances used by man for the production of musical sounds. Traditionally the instruments of modern Western music have been classified into three main divisions: stringed instruments, wind instruments, and percussion instruments. Stringed instruments are devices with strings as the sound-producing agent; the strings may be struck, plucked, or bowed to produce the required vibration. In wind instruments the sound is produced by setting a column or body of air in vibration. Percussion instruments are struck to produce the sound. Although adequate for Western orchestral instruments (see ORCHESTRA), the traditional system of classification is not comprehensive enough to include many instruments from other cultures, and certain recently developed types do not fit into any of the three categories. It falls short of providing a description of different sound-producing agents in percussion instruments, and its divisions are not mutually exclusive. For example, the piano (q.v.) is a stringed instrument, but inasmuch as the strings are struck with hammers, it may be considered a percussion instrument also.

Present-day musicologists generally recognize a more scientific system of classification devised in 1914 by the Austrian scholar Erich von Hornbostel (1877-1935) and the German-American music historian Curt Sachs (1881-1959). In this system, based on acoustical principles (see ACOUSTICS), musical instruments are divided into five primary classes: chordophones, aerophones, idiophones, membranophones, and electrophones. Chordophones are the stringed instruments and aerophones are the wind instruments of the old system. Idiophones are defined as those instruments made of naturally sonorous materials that do not require additional tension as does a string or a drumskin; examples are hollow logs or blocks of wood. Membranophones include instruments in which the sound is produced by the vibrations of a membrane stretched over a hollow resonator. Electrophones comprise the recently developed instruments in which tones are built up directly from oscillating electric currents. Because the terminology of the traditional classification system is

still common usage, it is used wherever possible in the following discussion.

Stringed Instruments. Such instruments are usually subdivided by shape. Lute family instruments have distinct necks. The strings may be plucked (as in the lute and guitar) or bowed (as in the violin). Bowed members of the lute family are termed the fiddle family. Zithers have no distinct necks. Their strings may be plucked, or they may be struck (as in the hammered dulcimer), or bowed (as in the bowed zither). In lyres, the strings are strung from a crossbar supported by two arms that jut out from the instrument's body. Harps are instruments in which the strings run perpendicular rather than parallel to the instrument's main surface. Harps and lyres are normally plucked, though some folk lyres are bowed. The harpsichord and the piano are instruments of the zither family that have been provided with a keyboard to cause the strings to be plucked (harpsichord) or struck (piano).

Wind Instruments. Wind instruments may be blown by the player's breath (as in a flute), or a wind supply may be fed mechanically by means of bellows (as in a bagpipe). The latter group includes the keyboard wind instruments, notably the organ, accordion (qq.v.), and concertina. Wind instruments played by human breath include the brasses and the woodwinds, which comprise the wind section of the modern orchestra, as well as nonorchestral instruments such as the harmonica (q.v.).

With the brasses the player's lips vibrate against the mouthpiece. The brass instruments include the bugle, cornet, trumpet, trombone, tuba (qq.v.), and French horn (see HORN). The saxhorn (q.v.) and sousaphone are variations of the tuba.

The woodwind group was given its name because these instruments originally were made of wood. Other materials, such as silver, ebony, and vulcanite, are now often used. Woodwinds may be subdivided into flutelike instruments and reed instruments, according to the manner in which the air column is set in vibration. In the flute (q.v.) family the player's lips direct the breath in a thin stream that breaks against a sharp edge. This group includes the transverse flute, blown across a mouth hole in the side of the tube; the piccolo, which is a small flute in a higher range; and the recorder (q.v.), an end-blown instrument in which a duct directs the air against a sharp edge cut in the instrument wall. In reed-type woodwinds, the player's breath sets in vibration a single or double reed, which is a thin blade of cane or



Noted jazz pianist Thelonius Monk (1920–) at the keyboard. Although the piano employs percussion, it is classified as a stringed instrument.

Columbia Records

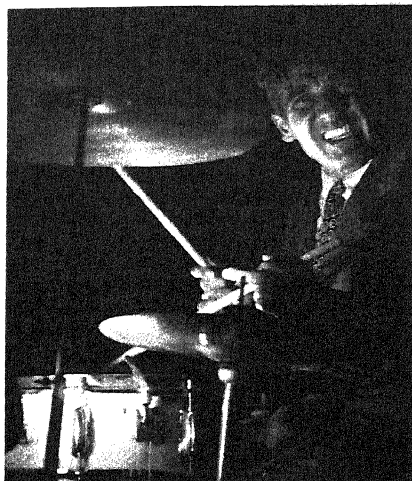
metal; see REED, in music. Woodwinds with a single reed include both the clarinet and saxophone (qq.v.). The oboe, bassoon (qq.v.), and English horn are examples of double-reed instruments.

In free-reed instruments, such as the harmonica, the reed sets in vibration the surrounding air; the vibration is of a free body of air rather than of a column enclosed in a pipe.

Percussion Instruments. This group may be divided into instruments made of a hard, sonorous substance that vibrates when struck and those in which a stretched membrane is struck. In the first group (the idiophones) are the bell, glockenspiel, marimba, xylophone (qq.v.), and celesta, all of which can be tuned to definite pitch; those of indefinite pitch include the castanets, cymbals, and triangle (qq.v.). A few idiophones are sounded by methods other than percussion (that is, the African mbira, or thumb piano, in which thin metal or wood tongues are plucked; and the nail violin, in which a violin bow causes carpentry nails to vibrate and produce sound). The second group (the membranophones) comprises the various types of drum (q.v.). With the exception of the kettledrum (q.v.), these instruments are not tuned to definite pitch.

Electrophones. Two types of instruments employ electricity: those in which the tone is produced mechanically and amplified electrically, as in the electric guitar; and the electrophones, in which the tone is produced electronically. See also CARILLON; ORGAN: *Electronic Organs*.

Electrophones include electronic pianos and



Rhythm is provided in music by drums, shown played here by bandleader Gene Krupa (1909–73). Some percussion instruments, including kettledrums, can be tuned to definite pitches.

Robert Parent

organs, experimental instruments such as the theremin (popular in the 1930's), and the sound synthesizer. First constructed in the 1950's, sound synthesizers are capable of producing a seemingly limitless range of sounds. They are used for composing music directly on magnetic tape, often with the aid of a computer (q.v.), and they enable composers to draw on a range of sounds not producible by orchestral instruments.

C.S. & J.V.

MUSICAL NOTATION, written symbols used to represent musical sounds. Because music involves many subtle nuances, particularly of rhythm (q.v.) and tone quality, musical notation has never completely represented the intentions of composers. One of the chief tasks of performing musicians is to interpret musical notation in terms of the time and place in which it was written and of the composer whose music is being played.

The ancient Greeks used letters of the alphabet, arranged in various positions, to represent music. This system is not understood today. During the Middle Ages (q.v.) the notation of chant (q.v.) made use of signs, called neumes, which were written in the blank spaces above chant texts. Neumes in their earliest appearance were short, squiggly lines roughly following the rise and fall of melody; later square-shaped neumes were devised. They did not indicate pitch (q.v.) and rhythm precisely but served only as a reminder to singers of melodic contours previously learned by rote. Because of the lack of a precise notation, the performance of chant melodies varied greatly from region to region. When church officials decided that the

MUSICAL NOTATION

same chant melodies should be used in all churches, a more precise notation was needed. By the 9th century a system had developed in which the distance of neumes above the level of the chant text indicated the height of pitches. The exact height was further clarified in the 10th century by the use of guidelines drawn across the page of musical text. By the 11th century these lines and the spaces between them had come to represent specific pitches, as they do in the modern musical staff. The Italian theorist Guido d'Arezzo (q.v.) is thought to have originated the concept of the staff. During the 9th to 11th centuries, neumes changed in appearance from short, irregularly shaped lines to square noteheads placed on the staves and often joined together with lines into groups of two or more. This type of notation is still used in liturgical books of the Roman Catholic Church.

The problem of notating rhythm was not solved until the late Middle Ages. During the 13th century composers used a system of short, rhythmic patterns, called rhythmic modes, one of which was repeated over and over until another mode was designated to supersede it. As composers sought greater rhythmic freedom, a system of notation evolved in the 14th century that enabled composers to specify the time value for individual notes and for periods of silence, called rests. This system permitted any succession of time values to occur, and composers began writing music, the rhythmic complexity of which has never been surpassed. Composers of the 15th century reacted against such complexity and reduced rhythmic possibilities and rhythmic notation to basically what prevails today: time signatures usually indicating double or triple meter and subdivisions of notes and rests into two or sometimes three notes of the next smaller value.

During the 15th and 16th centuries, vertical bar lines began to be drawn through the staves of keyboard and lute music as a visual aid to the musician. These lines helped the player to coordinate the various melodic lines and chords that made up a piece of music. Bar lines began to be used in music for voices and other instruments in the 17th century. By the 18th century musical notation had reached the form in which it is most commonly known today. The principal contribution of the 19th century was the incorporation of a large number of terms denoting emotional states such as "lively", "sadly", and "in an agitated manner".

Innovations in music during the mid-20th century have necessitated radical departures from the established methods of notation. Ver-

bal instructions, such as "play high pitches for five seconds" may be used in place of symbols. In some extreme cases, abstract designs or graphs replace specific indications of note value and pitch, and the performer is allowed to interpret rather freely what he sees on the page. Such notational methods are often confusing to musicians, and it has once again become a major problem among composers to devise generally acceptable methods for notating the sounds they wish to have produced.

See *MUSIC: History*; *SCORE*.

J.V.

MUSK DEER, small deer, *Moschus moschiferus*, of central and eastern Asia. It has no horns, and the canine teeth of the male project in the form of longish tusks. The male is much hunted for its musk, a substance secreted by a gland located in the abdomen; musk is used in the manufacture of perfume.

MUSKEGON, city in Michigan, and county seat of Muskegon Co., on the E. shore of Lake Michigan, at the mouth of the Muskegon R., about 35 miles N.W. of Grand Rapids. It is the industrial and shipping center for W. Michigan. Manufactured products include furniture, paper goods, machinery, and airplane and automobile parts. The city was settled about 1810, and became a fur-trading center and later a lumber center. It was incorporated as a city in 1869. Pop. (1960) 46,485; (1970) 44,631.

MUSKELLUNGE, or MASKINONGE, North American pike, *Esox masquinongy*, found in the Great Lakes region and in the Northwest, much esteemed as a game fish. It attains a length of 8 ft. and weighs up to 100 lb. It is bronze spotted with black. Unlike the northern pike, the muskellunge has scales only on the upper half of the cheek.

MUSKET. See *SMALL ARMS*.

MUSKHOGEAN or **MUSKOGEAN**, one of the important linguistic families of the North American Indians, formerly dominant in a large area in the southeastern United States, including all of the Gulf States east of the Mississippi R. Among the chief languages of the Muskogean family are Muskogee, spoken by most Creek and Seminoles; Choctaw, with which Chickasaw is grouped; and Natchez. The other major Muskogean languages are Hitchiti, spoken by a tribe of the same name, formerly living in Georgia; and Koasati, spoken by the Koasatis, formerly living in Alabama. See *AMERICAN INDIAN LANGUAGES*; and separate articles on most of the tribes and languages mentioned.

MUSKIE, **Edmund Sixtus** (1914–), American political leader, born in Rumford, Maine, and educated at Bates College and Cornell Univer-

sity Law School. In 1942, shortly after opening a law office in Waterville, Maine, Muskie enlisted in the United States Naval Reserve, remaining on active duty in World War II until 1945. He served in the State house of representatives (1946-51) and as Democratic Party national committeeman (1952-53).

After two terms as governor of Maine (1954-58), Muskie was elected to the United States Senate, the first Democrat to achieve that distinction in his State; he was reelected in 1964. He established a liberal voting record in the Senate and became known as an authority on air and water pollution, urban problems, and Federal-State relations.

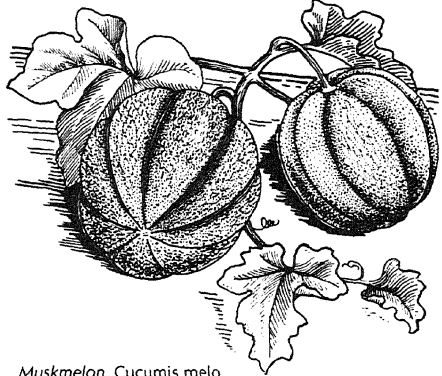
In 1968 Muskie was the Democratic Party candidate for the Vice-Presidency, on the ticket headed by Hubert H. Humphrey (q.v.). Humphrey and Muskie lost the election to the Republican Party candidates, Richard M. Nixon and Spiro T. Agnew (qq.v.), by a narrow margin of the popular vote. Muskie, however, was reelected to the U.S. Senate in 1970 by 63 percent of the popular vote. In January, 1972, Muskie announced his candidacy for the Presidency. Although he ran well in several State primaries and was considered the front-runner for the Democratic nomination, his lead began to evaporate in early summer. Muskie withdrew his candidacy in July, and he later refused an invitation to join the Democratic Presidential nominee, Senator George S. McGovern (1922-), as the party's Vice-Presidential candidate. In 1974 Muskie became chairman of the newly created Senate Budget Committee, and thereafter he frequently spoke out on fiscal matters. He was reelected to the Senate in 1976.

MUSKMELON, common name for several varieties of trailing, herbaceous, annual vines of the species *Cucumis melo* of the Gourd family, native to Africa and Asia, and widely cultivated for their edible fruits, also called muskmelons. The plants have tendrils and angled, but not distinctly lobed, leaves. The yellow flowers have bell-shaped corollas, three stamens, and a solitary pistil; male and female flowers, and in some varieties complete flowers, are borne on the same plant.

In the United States, the most common variety of muskmelon, var. *reticulatus*, sometimes called the nutmeg or netted muskmelon, has a thin, reticulated rind and sweet flesh which is peach-orange in color when ripe. It is often called cantaloupe (q.v.), a term correctly restricted to a variety of muskmelon, *cantalupensis*, seldom grown in the U.S. The casaba or winter melon, var. *inodorus*, has green or whitish

flesh with a mild scent and keeps well past the harvesting season into the winter. Honeydew melon, a smooth-skinned, white melon with sweet, light-green flesh, is derived from the casaba melon. Other varieties of melon are the mango or orange melon, also called the lemon cucumber, var. *chito*, with small, firm fruits used as pickles or preserves; and the snake or serpent melon, var. *flexuosus*, so called because of its curiously coiled or twisted shape.

Muskmelons require warm weather and sun-



Muskmelon, *Cucumis melo*

light and grow best in subtropical regions. They are grown throughout most of the U.S. and in the southwest they are grown in commercial quantities.

MUSKOGEE, linguistic families of American Indians. See MUSKHOGEAN.

MUSKOGEE, city in Oklahoma, and county seat of Muskogee Co., about 50 miles s.e. of Tulsa. It is the trading and industrial center of a vast agricultural region. The major industries produce agricultural implements, cotton goods, and glass, process food, and refined oil. Muskogee was founded as a railroad station in 1872, incorporated as a town in 1898, and chartered as a city in 1910. Pop. (1960) 38,059; (1970) 37,331.

MUSKOKA LAKES, scenic region of s.e. Ontario, Canada, lying e. of Georgian Bay (an arm of Lake Huron). The hilly area contains large forests, several rivers, and many lakes. Lake Muskoka, Lake Joseph, and Rosseau Lake, the chief lakes, are connected by rivers and artificial waterways. Bracebridge, Gravenhurst, and Huntsville are the principal settlements of the region, which offers extensive opportunities for hunting and fishing. It was formerly an important lumbering area.

MUSK OX, long-haired, dark-brown ruminant, *Ovibos moschatus*, belonging to the family Bov-

MUSKRAT

idae, found in northern Canada and Greenland. The musk ox travels in herds; formerly widespread in the Arctic Regions, the numbers of the musk ox have been drastically reduced, and the animal's range limited, by hunting for its hide and flesh. An adult bull averages about 8 ft. in length and has downward-curving horns with sharp, upturned tips. Females are much smaller with slightly separated horns. A strong scent of musk emanates from the bulls.

MUSKRAT, or MUSQUASH, aquatic North American ratlike rodent, *Ondatra zibethica*, so called because a pair of large glands, located in the groin, secrete a substance with a musky odor. It is dark brown above and lighter below, and has a long, laterally flattened tail for sculling and partially webbed feet. The fur of the muskrat is of great economic importance, and is used mostly for trimming.

MUSKWAKI. See FOX.

MUSLIM ART AND ARCHITECTURE. See ISLAMIC ART AND ARCHITECTURE.

MUSLIM CALENDAR. See ISLAMIC CALENDAR.

MUSLIM SECTS, Muslim groups whose religious doctrines contradict with or vary in some way from those of Sunnites, or the orthodox Muslims; see ISLAM. Muslim sectarianism began during the second half of the 7th century, with the first major schism in the Islamic community being caused by the issue of the succession to the caliphate. For the historical background, see CALIPH.

KHARIJITES

The Kharijites (Ar., *kharawrij*, "the leavers") were originally among the supporters of Ali (q.v.), the fourth caliph of Islam. Ali outraged them, however, when he allowed his claim to the caliphate to be arbitrated by his followers and by the partisans of Muawiyah I (d. 680). The Kharijites claimed that God (Allah) had decreed Ali's caliphate and therefore arbitration by mortals was sacrilegious. Thereafter, they repudiated not only Ali and Muawiyah, but all Muslims who did not accept their views. The Kharijites carried on guerrilla warfare throughout the reign of the Umayyad dynasty (founded by Muawiyah) and even temporarily conquered entire provinces, although they ceased being a serious military threat during the reign of the Abbasid dynasty.

According to Kharijite doctrine, not only descendants of the Prophet Muhammad (q.v.) and members of the Muslim aristocracy, but anyone, even a slave, could become caliph if he was morally and religiously pure. A caliph, to be legitimate (in accord with God's will), had to be elected as the free choice of the entire Muslim

community. An unsatisfactory caliph could be deposed or put to death. The Kharijites, both extremely pious and puritanical in religious practice and theory, also accepted only a literal interpretation of the sacred Koran (q.v.). They developed their own laws and collections of Hadith, the Traditions or Muhammad's actions and utterances witnessed by his companions and transmitted by reliable authorities.

Today about 500,000 Kharijites, usually referred to as Ibadites, survive, dwelling in north and east Africa, Oman, and Zanzibar (now part of Tanzania). Their puritanism and idealism have very much influenced the present-day Wahhabi movement, which includes the majority of Saudi Arabians; see WAHHABIS.

SHI'ITES

Shi'ites (Ar., *Shi'ah* "supporters of Ali"), is the general name for a large group of subjects that continue to regard the descendants of Muhammad through his daughter Fatima (q.v.) and her husband Ali as the only legitimate claimants to the caliphate. At the present time about 40,000,000 Shi'ites, nearly 10 percent of the total number of Muslims, exist in various parts of the world. Shi'ism is the majority faith in Iran and Iraq, and large numbers of Shi'ites live in Yemen, Syria, Lebanon, E. Arabia, N. India, and Pakistan.

The Shi'ites have played a much more important role in the history of Islamic political and theological thought than have the Kharijites. Initially, they were chiefly a political faction, upholding the claims of Ali and his descendants to leadership of the Islamic empire against rival claimants. By the third century of Islam, however, the Shi'ites had developed a religious doctrine maintaining that Muhammad himself had designated Ali as both his political successor and as the imam (spiritual leader) of the Muslim community; furthermore, that Ali and his descendants had been preordained by God for the caliphate. Consequently, Shi'ites have come to believe that the first three caliphs of Islam were illegitimate because they were usurpers who violated the Prophet Muhammad's choice. In their view, Muawiyah I, the fifth caliph of Islam, was another usurper who cheated Ali of his caliphate. They do not recognize any subsequent Sunni caliph as legitimate.

The Shi'ites also believe that Muhammad revealed certain secrets of divine knowledge to Ali, which were handed down from generation to generation among Ali's descendants. Thus each imam possesses superhuman qualities that uniquely qualify him to guide the Muslim community. His wisdom, for example, is infallible;

therefore his decisions must be accepted as final, a heretical view according to Sunnite Muslims because it dispenses with the practice of *Ijma*, the consensus of the qualified legal scholars of a given period, as a means of determining religious law.

In addition, the Shi'ites refuse to recognize any Hadith (Traditions) that cannot be authenticated as having originated among Muhammad's immediate descendants. They have their own collections of Traditions, called *Akhbar*, and their own authoritative transmitters of *Akhbar*. They have adopted also many other heterodox dogmas and modifications of religious practices, some of them very remote from orthodox Islam. Certain Shi'ites, for example, maintain that originally a portion of the Koran had mentioned the special place in Islam of Ali and his descendants but that this reference has been deleted from the present text. When they recite the creed of Islam, "There is no god but God and Muhammad is the messenger of God", they add "and Ali is his chosen friend". These Shi'ites have made devotion to the imam a religious obligation superseded only by the belief in the unity of God and in the mission of Muhammad.

SHI'ITE SUBJECTS

Since the Shi'ites broke from the main body of the Muslim community, they themselves have divided into numerous sects. Chief among these are the Imamis, Ismailis, and Zaidis.

Imamis. The largest contemporary Shi'ite subject is the Imami (Twelver) Shi'a, so named because they recognize twelve imams. The twelve imams begin with Ali and continue through his sons Hasan (about 624–669) and Husain (about 629–680) and all their descendants, whether or not they actually held power, to the twelfth and "hidden" imam, Mohammed al-Muntazar. The Imamis believe that the twelfth imam disappeared in 878 but is still living and will appear as the Mahdi (q.v.), or "rightly guided" one, at the "end of days" to restore justice to the world and establish the supremacy of Islam. "Twelver" Shi'ism was made the state religion of Persia in the 16th century, and remains today the state religion of Iran.

Ismailis. The major schism among the Shi'a occurred over who was to succeed the sixth imam, Jafar al-Sadiq (d. about 765), the great-grandson of Husain. Most Shi'ites recognized al-Sadiq's son Musa instead of his eldest son Ismail (d. 760), who was accused of the sin of drinking wine. Another group, however, recognized Ismail as the legitimate imam. This group, later called the Ismailis, or Seveners, because they recognize only seven legitimate caliphs, at-

tempted to establish an imam-caliph through militant social revolution and to undermine the orthodox religious doctrines by introducing new philosophical doctrines based on Neoplatonic and gnostic influences; see Gnosticism; NEOPLATONISM. As a result of their actions and a propaganda campaign begun in the 9th century, the Ismailis became widespread in the 11th century.

Ismaili Subjects. The earliest important Ismaili subject was the Qarmatian, or Karmatian, movement, named after Hamdan Qarmat, (fl. 9th cent.), their leader. The Qarmatians revolted in the name of Ismailism and for a time threatened the Abbasid caliphate. They even captured Mecca in 930 and carried off the sacred Black Stone of Kaaba, the main shrine of Islam. It was finally ransomed and returned in 952. They incurred great hatred, however, because of the atrocities they committed and by the end of the 10th century, under government persecution, they disappeared entirely. Nevertheless, their activities in support of the "house of Fatima" helped greatly in the establishment of the Fatimid state in Egypt and north Africa, the founders of which were Ismailis.

Today the Ismailis are divided into two main branches; the Mustalis, and the Nizaris, the main group. The division occurred in the 11th century, after the death (1094) of the Fatimid caliph al-Mustansir. The Mustalis supported his son al-Mustali, who was made caliph, and the Nizaris supported the eldest son Nizar, who they believe should have been made caliph. When the last Fatimid caliph in Egypt was deposed by Saladin (q.v.) in 1171, Ismailism came to an end there. The mustalis still had followers in Yemen, however, and from there the sect spread to India. At present its *dai* (leader) is Muhammad Burhan al-Din, at Bombay and most of the followers are known as *Bohras* (merchants). The adherents of the Nizari sect, who now number about twenty million, live mainly in India, Pakistan, Africa, and Syria. They recognize as their leader the Aga Khan (q.v.).

The most influential extremist Ismailite subjects have been the Assassins, Druzes, and Nusairis. The Assassins (see ASSASSIN) were a subject of the Nizaris, who developed in Persia in the 11th century. In 1090, under the leadership of Hasan ibn-al-Sabbah (d. 1124), they began a secretive program of terrorizing or killing their enemies. To insure unquestioning fanatic devotion, it was alleged, the members of the sect were drugged with hashish, made from the hemp plant (see CANNABIS). For about 150 years the Assassins held Persia and Asia Minor in ter-

MUSORGSKI

ror, but in 1256 the Mongols (q.v.) broke their political power in Persia, and in 1273 the Mamluke sultan crushed the Syrian branch; see MAMLUKES. The Druzes (q.v.) and the Nusairis also became separate Ismailite subjects in the 11th century. The complex, semisecret religious doctrines and rituals they developed and follow are considered by other Shi'ites to border on heresy.

Zaidis. The Zaidis, followers of Zaid (fl. 8th cent.), great-grandson of Ali through his son Husain, formed into a distinct subject in the 9th century. Except for their view of the caliphate, their doctrines and observances are closer to Sunniite (orthodox) beliefs than those of any other Shi'ite group. They added to the Shi'ite doctrine of the caliphate, however, their own requirement of taking up arms, if necessary, to insure that their ruler be a descendant of Ali. They established several states around the Caspian Sea and in Yemen and continued to rule in Yemen until 1962.

Recent Sects. In the late 19th and early 20th centuries, two more important Shi'ite subjects developed; Babism (q.v.), which in turn generated Bahai (q.v.), an altogether separate religion, and the Ahmadiya sect formed by Mirza Ghulam Ahmad (d. 1908) in India. Ahmad claimed to be the promised Mahdi, the Messiah (q.v.), a manifestation of Muhammad, and a reincarnation of the Hindu god Krishna (q.v.). He is believed to have tried to unite all religions under Islam.

MUSORGSKI, Modest Petrovich or **MOUSSORGSKY, Modest Petrovich** (1839–81), Russian composer, born in Karevo, near Pskov, and privately educated. In 1851 he entered a military academy at Saint Petersburg (now Leningrad). At the age of twenty-two he met the composer Aleksandr Sergeevich Dargomyzhski (1813–69), who introduced him to a group of composers, now known as "The Five", who were working to create a national Russian musical style; see RUSSIAN MUSIC. In 1858 Musorgski resigned from military service and began to devote his time to musical studies and composition. His major work, the opera *Boris Godunov*, based on a drama by the Russian author Aleksander Sergeevich Pushkin (q.v.), was completed in 1868 but was not produced until 1874, after considerable changes had been made; it reflects the nationalistic and democratic spirit of "The Five". In 1896, after Musorgski's death, *Boris Godunov* was reorchestrated by the composer's colleague, Nikolai Andreevich Rimski-Korsakov (q.v.), and is best known in this version.

Musorgski's efforts to make music realistic

and expressive of Russian life were best realized in his operas *Boris Godunov* and the uncompleted *Khovanshchina*, and in a number of characteristically Russian songs. *Khovanshchina* was also completed by Rimski-Korsakov. Among his other works are the piano suite, *Pictures at an Exhibition* (1874), and the orchestral symphonic poem, *A Night on Bald Mountain* (1867). **MUSQUASH.** See MUSKRAT.

MUSSEL, common name for any filibranchiate mollusk in the families Mytilidae and Unionidae; the former are marine, whereas the latter inhabit fresh water. The common sea mussel, *Mytilus edulis*, found attached to rocks on the shores of Europe and America, is widely used as food and fishing bait. The horse mussel, *Volzella modiolus*, another larger marine species with a similar distribution, is inedible. Of the freshwater mussels, which are found in rivers and streams in North America, Europe, and Asia, about sixty commercially important species are found in the United States. Their shells are used in button making. The mussels themselves secrete many pearls; most mussel pearls are of low quality, and are used in making inexpensive jewelry. See MOLLUSCA.

MUSSET, (Louis Charles) Alfred de (1810–57), French poet, born in Paris, where he briefly studied law and medicine. His first collection of verse, *Contes d'Espagne et d'Italie* ("Romances of Spain and Italy", 1829), was successfully published when he was nineteen years old. His first play, *Nuit Venitienne* ("Venetian Night", 1830), was a failure, but *Les Caprices de Marianne* ("The Caprices of Marianne", 1833) and *On Ne Badine Pas avec l'Amour* ("No Trifling with Love", 1834), are witty, romantic, and bitter-sweet comedies of manners that have remained in the classic repertory of French theatre. In 1833 he met and fell in love with the French writer George Sand (q.v.). He traveled with her to Italy, but after a prolonged series of quarrels he returned to France alone in 1834. His autobiographical novel *La Confession d'un Enfant du Siècle* ("Confessions of a Child of the Century", 1836), deals with this relationship as well as with the author's artistic and political philosophy of disillusionment.

Critics usually point to his lyrics as de Musset's most important work. These include the four well-known *Nights* ("La Nuit de Mai", "La Nuit de Décembre", "La Nuit d'Août", and "La Nuit d'Octobre"), first published between 1835 and 1837 in the periodical *Revue des Deux Mondes*. In English, *The Complete Works of Alfred de Musset* was published in a ten-volume edition in 1905.



Benito Mussolini addresses a crowd in Rome in 1935, from the Palazzo Venezia. UPI

MUSSOLINI, Benito (1883–1945), Italian dictator, born in Predappio, near Forlì, and educated at the University of Lausanne, Switzerland. A Marxian socialist, he was expelled from Switzerland in 1904, and later from Austria. He returned to Forlì and in 1911 started a small newspaper, *Lotta di Classe*. From 1912 to 1914 he edited *Avanti*, the Socialist Party newspaper, in Milan. In 1914, when he urged that Italy enter World War I (q.v.) against the Central Powers (q.v.), he was expelled from the Socialist Party. Subsequently, he founded the paper *Popolo d'Italia*, which was subsidized by the French to encourage the entry of Italy into the war on the side of the Allies. He was a member of the *bersaglieri*, or Italian army infantry corps, until wounded in February, 1917.

In 1919, he organized his followers into the first "Fascio di Combattimento", a group violently opposed to socialism and bolshevism; see FASCISM. By 1922 the group had swollen to 4,000,000 members. On Oct. 28, 1922, Mussolini and his followers marched on Rome; the *coup d'état* he thus effected gained him the premiership of Italy. He soon concentrated power in the hands of the Fascist Party, himself taking over the most influential portfolios. Although he ruled vigorously and oppressively, he gained the confidence of his countrymen and esteem in other nations. In 1929 Mussolini terminated the 60-year dispute between the church and state in Italy (see LATERAN TREATY; VATICAN CITY); and in 1931 he conducted negotiations leading to the withdrawal of the church from Italian political activities. In 1933 he announced a plan for a state-controlled guild system for industry in which he, as minister of corporations, took over the decisive position. From the beginning of his

official career Mussolini pursued a menacing foreign policy and, in 1935, ordered the invasion of Ethiopia. His defiance of the League of Nations (q.v.) and the successful campaign against the defenseless African country saw him at the zenith of his power. In 1938 he was made first marshal of the empire, but retained the title *Il Duce* (the leader).

The alliance of Italy with Germany and their impending defeat in World War II (q.v.), however, brought about Mussolini's downfall on July 25, 1943. Put under surveillance by his successor as premier of Italy, Marshal Pietro Badoglio (q.v.), he was rescued by German parachute troops and became head of the Fascist puppet government set up in northern Italy by the German dictator Adolf Hitler (q.v.). When the German government collapsed in April, 1945, Mussolini was captured during an attempt to flee the country, tried in a summary court-martial, and executed on April 28, 1945.

MUSTANG. See BRONCO.

MUSTARD, common name applied to pungent herbs of the family Cruciferae or Brassicaceae, belonging to the Pepper order, and particularly to several members of the genus *Brassica* (q.v.), that are cultivated for their seeds.

Hedge mustard is the common name of the genus *Sisymbrium* in the Mustard family. The common hedge mustard, *S. officinale*, has pinnate leaves, small yellow flowers, and firm, thick-walled pods. It grows as a weed in coastal regions of the United States. Tumble mustard, *S. altissimum*, has pinnatifid leaves, pale-yellow flowers, and long, rigid pods.

The mustard for commercial production is

MUSTARD GAS

prepared principally from the seeds of *Brassica nigra*, the black mustard, and *B. hirta*, the white mustard. Black mustard is a hirsute plant, 2 to 3 ft. high, with dark-green, lyre-shaped and lanceolate leaves, small yellow flowers, and short pods. The seeds are dark brown and have a pungent odor. The plant is common along roadsides and in wastelands throughout the U.S. White mustard is a somewhat smaller plant, with simi-



Mustard of the genus *Brassica*

lar leaves, but having larger flowers, bristly pods, and pale seeds. Another important member of the genus is curled mustard, *B. juncea* var. *crispifolia*, which has crisp, cleft leaves, used as salad greens, potherbs, and as a cooked vegetable.

The term "mustard" is applied to preparations of powdered mustard seed mixed with water and other substances, used as a condiment and as a medicinal substance. Table mustard is prepared by mixing the powdered seeds of black mustard with water, vinegar, and spices. This preparation is used as a condiment on foods, particularly meats. Powdered mustard seed is a powerful emetic. Mustard seeds are used for their rubefacient and counterirritant effect in the form known as a mustard plaster, prepared usually by spreading a paste of mustard seed, flour, and water on cloth.

MUSTARD GAS. See GAS WARFARE.

MUTANKIANG, city of the People's Republic of China, in Heilungkiang Province, on the Mutan R., 170 miles s.e. of Harbin. An industrial and rail center of the Manchurian uplands, it lies on the Chinese Eastern Railroad, the con-

struction of which in 1903 resulted in the growth of the city, succeeding Ningan to the s. Industry developed in the city when it was part of the Japanese puppet state of Manchukuo, from 1932 to 1945; see MANCHURIA. Plants now include sawmills, flour mills, and soybean-processing, paper, pulp, and machinery factories. The city lies in a chiefly lumbering area. The municipality was created in 1937. From then until 1943 it was capital of Mutankiang Province, and from 1946 to 1949 of Sungkiang Province. The name is also spelled Mu-tan-chiang. Pop. (1970 est.) 400,000.

MUTATION, sudden and permanent change in a gene, causing a variation (q.v.) in the hereditary characteristics. The term mutation is sometimes applied more broadly to include structural alterations of the chromosomes (q.v.); see HEREDITY: *Mutation*. Mutation is normally a very infrequent phenomenon; however, it can occur as a result of exposure to X rays, gamma rays, other radioactive emanations, and certain drugs. In human beings gene mutations produced by high-energy radiation are generally deleterious and can cause both mental and physical abnormalities. As a consequence, geneticists view with concern the increase in the level of atmospheric radioactivity resulting from the tests of nuclear weapons (q.v.); see RADIOACTIVE FALLOUT. By the late 1950's many prominent scientists throughout the world had expressed fears concerning the possible biological effects of nuclear explosions upon future generations.

MUTAZILITES. See ISLAM: *Theology and Philosophy*.

MUTINY, in criminal law (q.v.), unlawful resistance to a superior officer. In military law (q.v.), mutiny is defined as insubordination or rebellion against the authority of officers and is governed by the provisions of military law. These provisions include not only mutiny as defined above, but also the concealment of mutinous acts or the neglect to attempt their suppression. Offenders are tried by court-martial; see MILITARY COURTS. In the United States and Great Britain, resistance to or usurpation of the authority of a commanding officer of a merchant vessel, by one or more of the crew, is also considered mutiny, and the offense is punishable by fine and imprisonment. See also CONSPIRACY.

MUTTON. See MEAT.

MUTTRA. See MATHURA.

MUTUAL FUND, form of management-investment company that combines the funds of purchasers of its shares and invests those funds in a wide variety of securities; see INVESTMENT COM-

PANY. Mutual funds provide the investor with professional management of his funds and diversification of investment among the securities of many corporations.

Types. Most mutual funds are classed as open-end funds, meaning that the fund will redeem outstanding shares immediately upon request. Thus, the number of shares of a given mutual fund is not fixed, but fluctuates as new shares are sold to investors and outstanding shares are redeemed. A recent trend among investment companies established as open-end funds has been toward suspending the issuance of new shares when assets reach a predetermined level. Such funds become unlisted over-the-counter securities; a prospective investor can then buy shares only from a shareholder who wishes to sell. The purpose of such limitation of assets is to keep the mutual fund relatively small and thus to facilitate the management of the securities in the portfolio.

Closed-end funds generally have a fixed number of shares outstanding and are traded on the over-the-counter market or, in some instances, on stock exchanges. Shares are purchased and sold at the market price plus a commission. They may sell at a premium, that is, above the value of their assets, or at a discount, below the value of their assets.

Purposes. Mutual funds are classed according to their investment objectives: long-term growth of capital and income, stability of capital, or current income. In pursuit of the investment objective, some funds emphasize common stocks either of the "blue-chip" variety or of so-called growth companies; others specialize in stocks of companies within a single industry or group of industries. Balanced funds, which tend to be conservative in policy, establish a balance between common stocks and fixed-income securities. Other types of funds invest solely in preferred stocks or in bonds. Fully managed mutual funds are free by company policy to alter the composition of the portfolio according to the management's evaluation of the current market.

Open-end mutual funds may be sold by securities dealers and brokers, by a sales staff employed by the fund management, or directly by the fund to the investor. The last-named process carries no sales charge, or a purely nominal one, and such funds are called no-load.

The offering price and redemption price of a mutual fund are based on the market value of the securities in its portfolio. The offering price, except in the case of no-load funds, includes a sales charge, which usually begins at $7\frac{1}{2}$ to $8\frac{1}{2}$

percent and is successively reduced for quantity purchases. Redemption is usually at the current net asset value. The sales charge includes a management fee and a commission to the broker.

Shareholders of mutual funds receive investment income dividends derived from dividends and interest earned on securities in the portfolio. Capital gains distributions are made when and if long-term gains are realized on the sale of securities in the portfolio. Income dividends are paid quarterly or semiannually; capital gains distributions are usually made annually, toward the end of the fiscal year of the fund.

A variety of services are offered to shareholders by mutual funds. Most funds provide accumulation plans, in which investors may buy shares at regular intervals, have dividends reinvested automatically, and accept capital gains distributions in additional shares. These plans may be voluntary or contractual. In the contractual plan the shareholder obligates himself by contract to fulfill a specified investment goal. In such plans, called front-end-load plans, a large percentage of the sales charge for the total amount of the plan is deducted from the investments made in the first year of the plan. This percentage may range from 50 percent to 80 percent of the sales charge for a ten-year or fifteen-year plan. In voluntary plans the sales charge applies only to each individual investment made.

Many mutual funds offer withdrawal plans, under which shareholders may receive payments from their investment at regular intervals while income dividends and capital gains are reinvested.

Investment-management companies that operate several funds with varying objectives offer a conversion privilege, by which the shareholder may transfer his investment from one fund to another if his objective changes. Such transfers may be made at a nominal fee or none at all.

Mutual funds are regulated by Federal and State laws. The principal Federal statutes are the Securities Act of 1933, the Securities Exchange Act of 1934, and the Investment Company Act of 1940. Most States have laws regulating the organization of investment companies, and the funds are further governed by statutes covering the sale of securities in general by brokers and dealers.

See STOCK; STOCK EXCHANGE.

MUTUALISM. See SYMBIOSIS.

MUYBRIDGE, Eadweard, originally EDWARD JAMES MUGGERIDGE (1830-1904), British-

MUYSKA

American photographer and motion-picture pioneer, born in Kingston-on-Thames, England, where he was educated. After emigrating to the United States, he became a photographer for the Coast and Geodetic Survey. In May, 1872, by photographs, he demonstrated that when a horse runs, there is a moment when all the animal's feet are off the ground. In 1881, he invented the zoopraxiscope, a device by which he reproduced on a screen horse races, the flight of birds, and athletic contests. He wrote *The Horse in Motion* (1878) and *Animal Locomotion* (11 vol., including 100,000 photographic plates, 1887). Portions of the latter work were abridged and published under the titles *Animals in Motion* and *The Human Figure in Motion* (1901). See MOTION PICTURES, HISTORY OF: *The 19th Century*.

MUYSKA. See CHIBCHA.

MWERU, LAKE, lake of central Africa, on the border between Zambia and the Republic of Zaire, the former Belgian Congo. It is about 70 mi. long and 30 mi. wide. It is fed by the Luapula R. and drained by the Luvua R.

MYCENAE, ancient city in the plain of Argolis, in Greece, dating to the second half of the second millennium B.C. The ruins of the city are near the modern town of Mikinai. About 1400 B.C. Mycenae reached its height as the chief cultural and political center of a civilization that dominated the area of the Aegean Sea (q.v.) at that time; see MYCENAEAN ART AND ARCHITECTURE. In the age described in the epics of the Greek poet Homer (q.v.), Mycenae was the home of King Agamemnon (q.v.) and the leading city in the Greek world. Sometime after 1200 B.C., the supremacy of Mycenae came to a sudden end. A group of invaders, the Dorians (q.v.), came from the north and destroyed the Mycenaean civilization. Although the city was rebuilt it never regained its former splendor. About 468 B.C. Mycenae was besieged and destroyed by the inhabitants of Argos (q.v.), and was never rebuilt.

MYCENAEAN ART AND ARCHITECTURE, name applied to the art and architecture of Greece from about 1600 to 1100 B.C., especially the period about 1400 B.C. in which the ancient Greek city of Mycenae (q.v.) became the chief cultural and political center of Aegean civilization (q.v.).

Schliemann Excavations. The importance of Mycenae was brought to light by the German archeologist Heinrich Schliemann (q.v.), who, beginning in 1868, opened an entirely new area of Greek archeology as a result of his excavations at such ancient cities as Troy and Tiryns

(qq.v.). Although other sites of this phase of Greek civilization have been found in eastern and southern Greece, the splendor of the jewels, pottery, and painting that Schliemann found at Mycenae in 1876 revealed the city to be the preeminent center of the culture of this period.

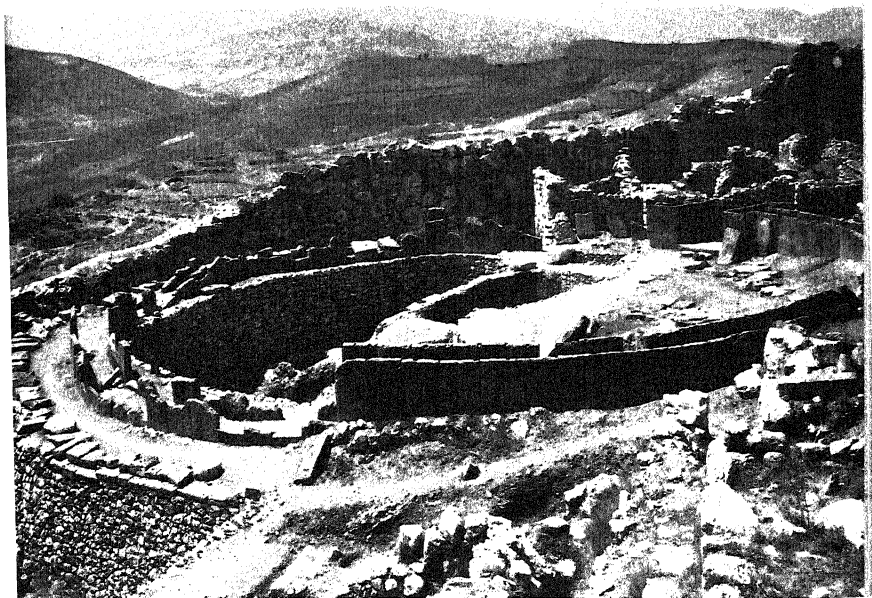


Pre-Hellenic vase with design of interlaced birds and bold concentric bands.
Metropolitan Museum of Art

An earlier phase of Aegean civilization, centered in the island of Crete (q.v.), is known as Minoan culture (q.v.).

The most notable examples of Mycenaean art and architecture are found at Mycenae itself. Among them are the Gate of the Lions, which was the chief entrance to the ancient acropolis (the fortified upper part of the city); and the Treasury of Atreus, a huge circular tomb built into the side of a hill, with a long entrance protected by side walls of stone. The name Cyclopean has been given to these structures, as well as to the walls in nearby Tiryns and Argos (q.v.), because they are built of huge, roughly hewn stones. These stones are so large that they were considered by the Greeks to be the work of a legendary gigantic people called the Cyclopes; see CYCLOPS.

Schliemann discovered five shaft graves hewn in the rock on the acropolis (q.v.) at Mycenae. These were arranged in a circle, evidently forming a sacred enclosure. The graves contained a great number of gold and silver ornaments,



Mycenaean ruins of six royal tombs dating from the 17th century B.C.
Ewing Galloway

swords, and vases, all of which are now in the National Archeological Museum in Athens. The death masks and other ornaments of thin hammered gold, as well as the decorations on the sword blades, reveal a high degree of artistic skill. In addition to the Treasury of Atreus, eight other domed tombs have been found, and also many smaller rock-cut burial chambers. More recent discoveries within the wall of the acropolis include a sixth shaft grave, the foundation walls of small houses and, near the summit of the acropolis, the ruins of a large palace. The plan of the palace is similar to that of the palace at Tiryns and resembles the home of the Greek hero Odysseus (see Ulysses), as described by the Greek poet Homer in the *Odyssey* (qq.v.).

Minoan Influence. Mycenaean art and architecture closely resemble that of a late phase of the Minoan period in Crete. Because of this, many archeologists once believed that the mainland of Greece was subjugated by the inhabitants of Crete, the Minoans, who imposed their civilization on the native Greeks. A more probable explanation and one maintained strongly by scholars in recent years is that the warlike Greek tribes of Achaeans (q.v.) raided Crete, acquired a taste for the rich culture of the Minoans, and transplanted it to the Greek mainland. This theory is supported by evidence that Mycenaean civilization contains certain elements not found among the Minoans and apparently of northern origin. Chief among these

non-Minoan elements are the construction in the palaces of megarai, or large rectangular halls, often with a porch and columns, which opened upon the court; the characteristic wearing apparel of the men; the use of the safety pin; and the greater military awareness of the Mycenaeans, as evinced, for example, by the strong fortifications surrounding their palaces. Differences in art and religion are also apparent. All such differences favor the view that a people with northern connections absorbed parts of the Minoan civilization but retained many features of their own culture.

The great civilization of the Mycenaean period was brought to a sudden end in the 12th century B.C. A Greek people known as the Dorians (q.v.) made a series of invasions from the north and overran the Greek mainland, forcing the inhabitants to flee to the islands of the Aegean and to Asia Minor (q.v.). Whereas the Achaeans had preserved the Cretan heritage, the Dorians destroyed it. Traditions and memories of the Mycenaean period lived on, however, and provided the themes for the epic poems of Homer, the *Iliad* (q.v.) and the *Odyssey*.

MYLAE, BATTLE OF, strategic sea battle of 260 B.C. fought in the first of the Punic Wars (q.v.). In this battle, the first large naval fleet ever built by the Romans engaged a Carthaginian squadron at Mylae, a seaport of northern Sicily (now Mi-

MYNA

lazzo). Under the leadership of the Roman consul Gaius Duilius (fl. 3rd cent. B.C.) the newly built navy of Rome defeated the superior Carthaginian force by bold tactics involving the use of grappling hooks and the boarding of enemy vessels. The victory gave Rome sufficient control of the seas to land a force on Corsica (q.v.) and expel the Carthaginians from that island.

MYNA, or MINA or GRACKLE, common name for any of the oscine birds in the genera *Acridotheres*, *Gracula*, and *Mino* of the Starling family, Sturnidae. These birds are found in S.E. Asia, New Guinea, and Ceylon. They are readily tamed and can be taught to mimic the human voice. Mynas are popular as cage birds. Mynas in *Acridotheres* have crested heads, with short, stout, yellow bills. They feed on insects and fruit, and nest in holes in the ground. The female lays five or six speckled, bluish eggs in a clutch. The hill mynas of *Gracula* have a pair of wattles on each side of the head, and have square tails. They feed chiefly on fruit and nest in hollow trees. The female lays five or six speckled, bluish eggs in a clutch. *Acridotheres tristis*, about 10 in. long, is brown above and on the abdomen, and is glossy black on the head, neck, breast, wings, and tail. *Gracula religiosa*, about 13 in. long, is black with a white spot on each wing. Both species are common in India.

MYOCARDITIS, inflammation of the heart muscle. Myocarditis is most commonly caused by, or associated with, a viral infection, although it can occur in connection with many other diseases, infections, and hypersensitivity

states. In most cases it involves the entire heart. Symptoms usually are an aching pain over the heart, often associated with fever, rapid pulse, and often lowered blood pressure. If severe, the impaired function of the involved heart muscle may cause heart failure.

Treatment depends on the cause, but, in general, patients are kept at rest and recover spontaneously. In many instances, however, there may be one or many relapses, and sometimes permanent weakening and scarring of the heart muscle may result. L.J.V.

MYOPIA. See EYEGLASSES; VISION: *Sight Defects*.

MYRDAL, (Karl) Gunnar (1898–), Swedish economist, sociologist, and Nobel laureate, internationally known for his analyses of racial prejudice, poverty, and economic development.

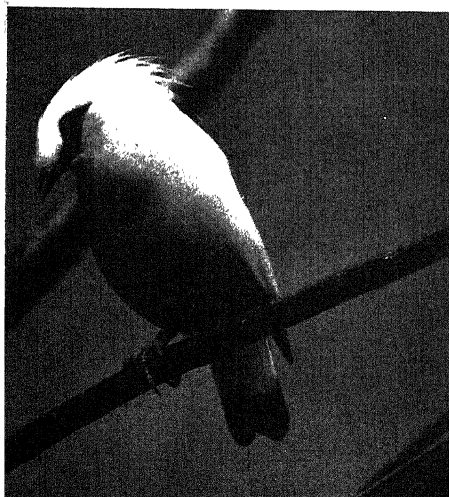
Myrdal was born in Gustafs on Dec. 6, 1898, and was educated at the University of Stockholm, receiving a law degree in 1923 and a Ph.D. in economics in 1927. He was professor of political economy and financial science at the University of Stockholm from 1933 to 1950 and became professor of international economy there in 1960. In the 1930's Myrdal published works on classical economic theory, financial policy, and, in collaboration with his wife, Alva Reimer Myrdal (1902–), writings on Sweden's declining birthrate.

From 1938 to 1942, Myrdal was engaged by the Carnegie Corporation to study the status of Blacks in the United States. The book that resulted from his investigations, *An American Dilemma: The Negro Problem and Modern Democracy* (1944), written with Richard Sterner and Arnold Rose, had wide influence. In it the authors suggested that racial discrimination in the U.S. was an aspect of a national conflict between the generally held ideals of brotherhood, equality, and freedom and particular instances of prejudice, rivalry, and discrimination.

In 1945 Myrdal joined the Swedish cabinet as secretary of commerce, and from 1947 to 1957 he headed the United Nations Economic Commission for Europe. He then conducted a monumental ten-year study of economic and social conditions in South Asia, which culminated in 1968 with the publication of *Asian Drama: An Inquiry into the Poverty of Nations*. Myrdal's other books include *Challenge to Affluence* (1963), a study of poverty within rich nations, and *Against the Stream* (1973), a collection of essays on economics. Myrdal shared the 1974 Nobel Prize in economics with the Austrian-born economist Friedrich A. von Hayek (q.v.). Myrdal's wife Alva has held several posts in the

Rothschild's myna, found on the island of Bali, is considered an endangered species.

Frank Stevens II—National Audubon Society



Swedish cabinet and diplomatic corps and in U.N. organizations; she also has been prominent in women's rights activities. The Myrdals' son, Jan (1927–), a noted social scientist, has written *Report from a Chinese Village* (1965), among other works.

MYRICA, genus of shrubs including several varieties of bayberry (q.v.).

MYRMIDONS, in Greek mythology, inhabitants of the island of Aegina in the Saronic Gulf, the followers of the hero Achilles (q.v.) during the Trojan War (q.v.). During the reign of Achilles' grandfather, Aeacus (q.v.), the inhabitants of Aegina were punished by Hera, the jealous wife of Zeus (qq.v.). Incensed because Zeus loved Aegina, the maiden for whom the island was named, Hera sent a terrible pestilence that destroyed the entire population. Aeacus, in despair, prayed to Zeus, reminding him that he was his son and beseeching his help in stopping the plague. As he prayed he saw a troop of ants, and he cried out to Zeus to transform them into people numerous enough to fill his empty city. That night he dreamed that the ants were being changed into human beings, and in the morning he found that his dream had come true and that his island was repopulated with many men, all of them pledging that they were his faithful subjects. Because Aegina was repopulated from an anthill, its people became known as Myrmidons, from the Greek word for ants (*myrmēkes*). **MYRON** (fl. about 450 B.C.), Greek sculptor, born in Eleutherae. He worked primarily in bronze. Myron excelled in modeling athletes, animals, and figures in motion, but was criticized for his inability to render emotions of the mind. His most celebrated works were the "Discobolus" ("Discus Thrower"), "Athena and Marsyas", "Ladas the Runner", and "A Cow in the Marketplace of Athens". Copies of only the first two have survived.

MYRRH, aromatic gum resin, of which the true form is obtained from the tree *Commiphora abyssinica* in Africa and Arabia. Although similar species of the genus, such as *C. myrrha*, *C. playfairii*, and *C. africanum*, yield a similar product, the quality is inferior. Myrrh consists of a mixture of resin, gum, and the essential oil myrrhol, which produces the characteristic odor. It has a bitter, pungent taste, and ranges in color from yellowish brown to reddish brown. Myrrh was highly valued in ancient times as an ingredient of perfume and incense, and was also used as an ointment. The myrrh mentioned in the Bible (Ps. 45:8; Song of Sol. 4:14) is believed to have been a mixture of myrrh and the oleoresin labdanum. One of the three gifts of the Magi to Jesus Christ

(Matt. 2:11) was myrrh. The gum resin was also used as a stimulant tonic and is used today as an antiseptic in mouthwashes and dentifrices.

MYRTILUS. See **PELOPS**.

MYRTLE, common name applied to shrubs of the genus *Myrtus*, belonging to the family Myrtaceae. The common myrtle, *M. communis*, is well known as a beautiful evergreen shrub, or a tree of moderate size, with white flowers. Myrtle is a native of all the countries around the Mediterranean Sea, and of the temperate parts of Asia, often forming thickets, sometimes within the reach of sea spray. The leaves are ovate or lanceolate, varying much in breadth. They are astringent and aromatic, contain a volatile oil, and were used in ancient times as a stimulant. The berries are aromatic, and were used in the preparation of medicine in Greece and India. A myrtle wine was also made. Myrtle bark is used for tanning in southern Europe. The small-leaved myrtle of Peru, *M. microphylla*, has red berries the size of a pea that have a sweet and pleasant flavor. The berries of the species *M. lauma* are eaten in Chile. Also edible are the berries of the downy myrtle, *M. tomentosa*, that grows on the Nilgiri Hills, in southeast India, and those of the white-berried myrtle, *M. leucocarpa*, found in Greece and Syria.

MYSIA, in ancient geography, a district of N.W. Asia Minor (in what is now Turkey), bounded on the N. by the Propontis, or Sea of Marmara, on the E. by Bithynia and Phrygia, on the S. by Lydia, and on the W. by the Aegean Sea. Troas, the area surrounding the ancient city Troy (q.v.), was one of its subdivisions. The Mysians seem to have been a Thracian people who crossed over to Asia at an early period. Mysia was subject to Lydia and later, under Persian domination, formed with Lydia one of the satrapies created by Darius I (see *under* **DARIUS**). After the death of Alexander III (q.v.), King of Macedonia, called the Great, the country shared in the vicissitudes of Asia Minor during the wars among his successors. Mysia became important in the 3rd century B.C. with the rise of the kingdom of Pergamum (q.v.). Mysia was bequeathed to the Romans by Attalus III, King of Pergamum (see *under* **ATTALUS**), in 130 B.C. and became part of the Roman province of Asia.

MYSORE, city of the Republic of India, in Karnataka State (previously named Mysore State), former dynastic capital of the Mysore maharajas, about 80 miles S.E. of Bangalore. The city is noted for silks, sandalwood perfume, and handicrafts of ivory, metal, and wood. Places of interest include the maharaja's palace, and the ivory throne inlaid with silver and gold that is in

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the palace. The University of Mysore, founded in 1916, is located in the city. Mysore was founded in the 16th century and served as the dynastic capital until 1610, when the capital was moved to Seringapatam. Mysore was again the capital from 1799 to 1831, when Bangalore (q.v.) was made the administrative capital. Pop. (1971) 355,636.

MYSTERIES, CLASSIC, secret rites and ceremonies connected with various religious worship of ancient Greece and Rome. These rites and ceremonies were known to, and practiced by, congregations of men and women who had been duly initiated; no other persons were allowed to participate. The origin and the purpose of the mysteries are unknown. The theory that the mysteries concealed deep truths and remnants of a primitive revelation too profound for the popular mind is no longer believed, but undoubtedly the sacred rituals brought to the initiates secret religious doctrines, which in many instances were concerned with the continuance of life beyond the grave. The mysteries consisted of purifications, sacrificial offerings, processions, songs, dances, and dramatic performances. Often the birth, suffering, death, and resurrection of a god were enacted in dramatic form. The aim of the mysteries seems to have been twofold, namely, to give comfort and moral instruction for life on earth, and to inspire hope for life after death.

The earliest and most important Greek mysteries were the Orphic, the Eleusinian, and the Dionysiac. The Orphic mysteries were those of a mystic cult founded, according to tradition, by the legendary poet and musician Orpheus (q.v.), to whom was attributed a great mass of religious literature; see ORPHISM. Far more celebrated were the Eleusinian mysteries (q.v.), connected with the worship of the goddesses Demeter and Persephone (qq.v.) at Eleusis in Attica; with these divinities were associated Pluto (q.v.), god of the underworld; Iacchus, a name of the youthful Dionysus (q.v.), god of vegetation and of wine; and other gods. The worship of Dionysus, or Bacchus (q.v.), at Athens was accompanied by feasts, processions, and by musical and dramatic performances. In later times the mysteries associated with Dionysus became occasions for intoxication and gross licentiousness. They were forbidden at Thebes and later elsewhere in Greece. As the *Bacchanalia* these rites were introduced into Rome early in the 2nd century B.C. At first the mysteries were celebrated only by women; when they were opened to men, the gatherings were suspected of gross immoralities, and in 186

B.C. the Roman Senate attempted to suppress the rites by decree.

Secret rites were a part of the worship of several Greek deities, such as Hera, queen of the gods, Aphrodite, goddess of love, and Hecate (qq.v.), goddess of the underworld. Many foreign religions which the Greeks and Romans adopted had mysteries connected with the worship of the divinity; these religions included the worship of the Phrygian goddess Cybele (q.v.), the "great mother" of the gods; that of the Egyptian Isis (q.v.), goddess of the moon, nature, and fertility; and that of the Persian Mithras (q.v.), god of the sun. The worship of these deities spread throughout the Greco-Roman world and was extremely popular in the early centuries of the Roman Empire. Isis, who at an early date had been identified with Demeter, was worshiped in Italy as late as the 5th century A.D. See also GREEK RELIGION AND MYTHOLOGY.

MYSTERY PLAY, term sometimes used to refer to the medieval type of drama known as the miracle play (q.v.). Some literary authorities make a distinction between the two, designating as mystery plays or mysteries all types of early medieval drama that draw their subject matter from Gospel events, and as miracle plays all those dealing with legends of the saints. See also MORALITY PLAY.. The distinction is not generally observed today.

MYSTERY STORY, type of fiction comprising the detective story, the novel of detection, the realistic detective novel, and the novel of suspense. The novel of suspense includes many types of fiction dealing with crime, adventure, international intrigue, and similar themes.

The Detective Story. The detective story, in the strict sense of the term, is one in which a detective, professional or amateur, solves a crime by a process of logical deduction, and in which the author provides the reader with enough data to reach the same solution as the detective.

The detective story as a form was invented by the American short-story writer, poet, and essayist Edgar Allan Poe in his story "The Murders in the Rue Morgue" (1841), although episodes of deduction occur in earlier literature, as in the exploits of the prophet Daniel (q.v.) in the Apocrypha. Poe wrote five detective stories, three of which concerned C. Auguste Dupin, the first detective to appear in a series of stories. Although all Poe's stories were widely read in his day, they exerted no immediate influence. The earliest detective stories long enough to be called novels include *Uncle Silas* (1864), by the Irish journalist and author Joseph Sheridan Le



Title picture used for an edition of Edgar Allan Poe's *The Murders in the Rue Morgue*.
Bettmann Archive

Fanu (1814–73); *The Moonstone* (1868), by the British novelist Wilkie Collins; *The Mystery of Edwin Drood* (1870), an unfinished novel by the British novelist Charles Dickens; and the novels of the French writers Émile Gaboriau (1833–73) and Fortuné de Boisgobey (1821–91).

The widespread popularity of detective fiction dates from the creation of the character Sherlock Holmes by the British physician, novelist, and detective-story writer Sir Arthur Conan Doyle in his novel *A Study in Scarlet* (1887). Holmes, one of the best-known characters in English fiction, is a lean, hawk-nosed private detective who has many eccentric habits. New stories by Doyle about Holmes continued to appear until 1927. For many readers the tales symbolize the entire Victorian era, including gaslight and hansom cabs. Although Doyle contributed little to the technical form of the detective story, he demonstrated that its success depends not only on ingenuity and deduction but also on the creation of atmosphere and of personality.

Following the appearance of Doyle's stories about Holmes many authors wrote detective stories in which the personality of the detective was emphasized. In a number of stories personality was confused with eccentricity. Among the more extreme examples is a blind detective, in *Max Carrados* (1914) by the British writer Ernest Bramah (pen name of Ernest Bramah Smith, 1869?–1942), and a detective who is also a brilliant criminal, in *Arsène Lupin, Gentleman-Cambrioleur* (1907) by the French writer Maurice Leblanc (1864–1941). The British writer

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Richard Austin Freeman (1862–1943) introduced accurate medical science and jurisprudence in his stories about the cases of Dr. Thorndyke, for example, *The Singing Bone* (1912). The greatest ingenuity, literary excellence, and moral sensitivity are found among the detective stories of the early 20th century, in *The Innocence of Father Brown* (1911) by the British author Gilbert Keith Chesterton and in *Uncle Abner* (1918) by the American writer Melville Davisson Post (1871–1930). In the 1920's and 1930's the American author S. S. Van Dine (pen name of Willard Huntington Wright) wrote many detective stories about the erudite private detective Philo Vance, beginning with *The Canary Murder Case* (1927).

The Novel of Detection. The novel of detection is a type of detective fiction in which the deductive puzzle is enlivened by emotion, humor, and the development of characters other than the detective. The first work of this type was *Trent's Last Case* (1913) by the British writer Edmund Clerihew Bentley (1875–1956). In the 1920's the British authors Anthony Berkeley (pen name of Anthony Berkeley Cox, 1893–; *The Poisoned Chocolates Case*, 1929) and Dorothy L. Sayers (1893–1957; *Strong Poison*, 1930) produced outstanding novels of detection that influenced many other writers.

The novel of detection flourished during the

A scene from *A Study in Scarlet*, the novel in which Sir Arthur Conan Doyle's immortal detective Sherlock Holmes first appeared.
Bettmann Archive



MYSTERY STORY

1930's and many writers who began producing this type of story in that decade are still today among the most popular authors of detective fiction. They include the American authors Elery Queen (pen name of Frederic Dannay and Manfred B. Lee; *The Chinese Orange Mystery*, 1934; *Cop Out*, 1969) and Rex Stout (1886– ; *Fer de Lance*, 1934; *The Father Hunt*, 1968); the British authors Nicholas Blake (pen name of the poet and critic C(ecil) Day-Lewis; *The Beast Must Die*, 1938; *The Private Wound*, 1968) and Michael Innes (pen name of John Innes Mackintosh Stewart, 1906– ; *Lament for a Maker*, 1938; *Picture of Guilt*, 1969); and the New Zealand author Ngaio Marsh (1899– ; *Vintage Murder*, 1937; *Clutch of Constables*, 1969). Most critics agree that the most deceptive and puzzling novels of detection were written by the British author Agatha Christie (*The A.B.C. Murders*, 1936; *By the Pricking of My Thumbs*, 1968). The acknowledged master of the so-called impossible situation was the American author John Dickson Carr (1906–77; *The Crooked Hinge*, 1938; *The Ghost's High Noon*, 1969), who wrote also under the pen name Carter Dickson (*The Judas Widow*, 1938; *The Bowstring Murders*, 1966).

The Realistic Detective Novel. The realistic detective novel is a type of detective fiction that contains many scenes of violence, sexual adventure, and even sadism described in a starkly realistic manner, and in which the characters, and often the narrator also, use a style of speech that purports to be the authentic jargon of criminals and their associates. The realistic detective novel was developed by writers for the so-called pulp magazines of the United States during the

1920's, especially in the magazine *Black Mask*, edited by Joseph T. Shaw (1874–1952). The realism of this type of novel is a reaction against the artificial gentility of much previous detective fiction. The best writers of the realistic detective novel are the American authors Dashiell Hammett (*The Maltese Falcon*, 1930), Raymond Chandler (1888–1959; *Farewell My Lovely*, 1940), and Ross Macdonald (pen name of Kenneth Millar, 1915– ; *Find a Victim*, 1954; *The Good-bye Look*, 1969). An especially popular American author of realistic detective novels is Mickey Spillane (1918– ; *I, the Jury*, 1947; *The Delta Factor*, 1968), whom some critics accuse of glorifying the extremes of sexual adventure and sadism. The American author Erle Stanley Gardner (1889–1970; *The Case of the Lucky Legs*, 1934; *The Case of the Fabulous Fake*, 1969), possibly the most prolific detective novelist, retained the vigor of the realistic style without its brutality, and his novels are notable for their fast action and legal ingenuity.

Another type of realism is represented by the novel of routine police procedure. This type was developed by the American author Ed McBain (pen name of Evan Hunter, 1926– ; *Cop Hater*, 1956; *Fuzz*, 1968) and the British author John Creasey (1908–73; *Gideon's Day*, 1955; *Double for Death*, 1969).

The Novel of Suspense. The novel of suspense includes many types of fiction, among them adventure and spy stories, such as those of the British author, lawyer, and diplomat John Buchan, 1st Baron Tweedsmuir (1875–1940; *The Thirty-Nine Steps*, 1915). Other novels of this type include those of the British authors Eric Ambler (1909– ; *Journal into Fear*, 1940; *The Intercom Conspiracy*, 1969), Ian Fleming (1908–64), creator of British Secret-Service agent James Bond (*Dr. No*, 1958), and Len Deighton (1929– ; *The Ip-press File*, 1963). They also include the works of the British author Graham Greene, such as the study in crime in *Brighton Rock* (1938). Novels of suspense without detection are those of Cornell Woolrich (1903– ; *The Bride Wore Black*, 1940) and Charlotte Armstrong (1905–69; *Mischief*, 1950). Some novels of suspense feature a detective but are primarily studies in criminal psychology, without puzzle or deduction, as in the Inspector Maigret novels by the Belgian author Georges Simenon (1903– ; *The Crime of Inspector Maigret*, 1932; *Maigret Hesitates*, 1970). The brutally ironic novel of crime and punishment is a type originated by the American author James M. Cain (1892–1977; *The Postman Always Rings Twice*, 1934) and written later by the American authors Jim Thompson (1906– ; *The Killer In-*

Ian Fleming, creator of the sophisticated agent James Bond.

Wide World



side Me, 1952) and Charles Williams (1909- ; *Hell Hath No Fury*, 1953).

The Serious Mystery. A type of mystery story destined for development is that in which the author combines the character study and social comment of serious fiction with the puzzles and surprises of the detective story. Outstanding novelists in this form include the American writers Vera Caspary (1904- ; *Laura*, 1943) and Margaret Millar (1915- ; *Beast in View*, 1955) and the British writers Andrew Garve (pen name of Paul Winterton, 1908- ; *No Tears for Hilda*, 1951), Julian Symons (1912- ; *The Man Whose Dreams Came True*, 1969), and John Le Carré (pen name of David Cornwell, 1931- ; *The Spy Who Came in from the Cold*, 1964).

An extensive critical literature on the mystery story exists. Some critics maintain that the type is a symbolic ritual of guilt and retribution. In the view of others it is an expression of faith in democratic legal processes, a literature of violence written under the influence of a violent century, an intellectual exercise, and one of the last survivals of the type of fiction constructed around a formal plot.

See separate articles for the authors whose birth and death dates are not given.

A.Bo. & L.delR.

MYSTIC, unincorporated village of Connecticut, in New London Co., part of Stonington town, at the mouth of the Mystic R., on Fishers Island Sound, 7 miles E. of New London. The modern village produces paper products, marine equipment, cutlery, and industrial sand. Mystic, called the "Cradle of Square Riggers" and the "Home of Yachtsmen", is famous as a tourist center. It is the site of Mystic Seaport, a re-created waterfront village of the early 1800's, which contains about forty buildings including a marine museum. At berth in the seaport is the *Charles W. Morgan*, the last of the wooden whaling ships. Built in 1841 it sailed for eighty years and caught more whales than any other ship of its day. The village of Mystic was founded in the 1600's and became a fishing port in the 1700's and a whaling and shipbuilding center in the 1800's. Pop. (1970) 2568.

MYSTICISM (Gr. *mystikos*, "pertaining to secret rites"), an immediate, direct, intuitive, knowledge of God or of ultimate reality. There is a wide variation in both form and intensity of mystical experience. The authenticity of any such experience, however, is not dependent upon the form but solely upon the quality of life that follows the experience. The mystical life is characterized by enhanced vitality, productivity, serenity, and joy as the inner and out-

ward aspects harmonize in union with God.

Non-Christian Mysticism. Elaborate philosophical theories have been developed in an attempt to explain the phenomena of mysticism. Thus, in Hindu philosophy (see HINDUISM), and particularly in the metaphysical system known as the Vedanta (q.v.), the self or Atman in man is identified with the supreme self (*brahman*) of the universe. The apparent separateness and individuality of beings and events are held to be an illusion (Skr., *maya*), or convention of thought and feeling. This illusion can be dispelled through the realization of the essential oneness of Atman and brahman. When the religious initiate has overcome the beginningless ignorance (Skr., *avidya*) upon which depends the apparent separability of subject and object, of self and no self, a mystical state of liberation, or moksha, is attained. The Hindu philosophy of Yoga (q.v.) incorporates perhaps the most complete and rigorous discipline ever designed to transcend the sense of personal identity and to clear the way for an experience of union with the divine self. In China, Confucianism (q.v.) is formalistic and antimystical, but Taoism (q.v.), as expounded by its traditional founder, the Chinese philosopher Lao-tzu (q.v.), has a strong mystical emphasis.

The philosophic ideas of the ancient Greeks were predominantly naturalistic and rationalistic (see NATURALISM; RATIONALISM), but an element of mysticism found expression in the Orphic and other sacred mysteries (see ELEUSINIAN MYSTERIES; MYSTERIES, CLASSIC; ORPHISM). A late Greek movement, Neoplatonism (q.v.) was based on the philosophy of Plato and also shows the influence of the mystery religions. The Muslim Sufi sect (see SUFISM) embraces a form of theistic mysticism (see THEISM) closely resembling that of the Vedanta. The doctrines of Sufism found their most memorable expression in the symbolic works of the Persian poets Shams ud-din Mohammed, better known as Hafiz (q.v.), and Jalal-ud-din Rumi (1207-73) and in the writings of the Persian al-Ghazzali (see GHAZZALI, AL-). The mysticism of the pre-Christian period is evidenced in the writings of Philo Judaeus (q.v.).

Christian Mysticism. Saint Paul (q.v.) was the first great Christian mystic. The New Testament writings noted for their deeply mystical emphasis are his letters and the Gospel of John (see JOHN, GOSPEL ACCORDING TO SAINT) but Christian mysticism as a system is derived from Neoplatonism through the writings of Dionysius the Areopagite (q.v.), or Pseudo-Dionysius. The 9th-century Scholastic philosopher Johannes Scotus

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Erigena (q.v.) translated the works of Pseudo-Dionysius from Greek into Latin and thus introduced the mystical theology of the Eastern Church (see ORTHODOX CHURCH) into Western Europe, where it was combined with the mysticism of the early Christian prelate and theologian Saint Augustine (q.v.).

In the Middle Ages mysticism was often associated with monasticism (q.v.). Some of the most celebrated mystics are found among the monks of both the Eastern Church and the Western Church, particularly the 14th-century Hesychasts of Mt. Athos in the former, and Saints Bernard of Clairvaux, Francis of Assisi (qq.v.), and John of the Cross (1542-91) in the latter. The French monastery of Saint Victor, near Paris, was an important center of mystical thought in the 12th century. The renowned mystic and Scholastic philosopher Saint Bonaventura (q.v.) was a disciple of the monks of St. Victor. Saint Francis, who derived his mysticism directly from the New Testament without reference to Neoplatonism, remains a dominant figure in modern mysticism. Among the mystics of Holland were the Blessed Jan van Ruysbroeck and Gerhard Groote (qq.v.), the latter a religious reformer and founder of the monastic order known as the Brothers of the Common Life. Johannes Eckhart (about 1260-1327), commonly referred to as Meister Eckhart, was the foremost mystic of Germany. Other important German mystics are Johannes Tauler (1300?-61) and Heinrich Suso (1300-66), followers of Eckhart and members of a group called the Friends of God. One of this group wrote the *German Theology* that deeply influenced the German reformer Martin Luther (q.v.). Prominent later figures include Thomas a Kempis (q.v.), generally regarded as the author of *Concerning the Imitation of Christ*. English mystics of the 14th and 15th centuries include Margery Kempe (1370?-1440?) and Richard Rolle (1300?-49), Walter Hilton (d. 1396), Julian of Norwich (1342?-1413?), and the anonymous author of *The Cloud of Unknowing*, an influential treatise on mystic prayer.

A number of the most distinguished Christian mystics have been women, notably Saint Hildegard, Saint Catherine of Siena, and Saint Theresa (qq.v.). The 17th-century French mystic Jeanne Marie Bouvier de la Motte-Guyon (see GUYON, MADAME), introduced into France the mystical doctrine of quietism (q.v.); see also FÉNELON, FRANÇOIS DE SALIGNAC DE LA MOTHE.

By its pursuit of spiritual freedom, sometimes at the expense of theological formulas and ecclesiastical discipline, mysticism may have con-

tributed to the origin of the Reformation (q.v.), although it inevitably came into conflict with Protestant, as it had with Catholic, religious authorities. The Counter-Reformation inspired the *Spiritual Exercises* of Saint Ignatius of Loyola (q.v.). *The Practice of the Presence of God* by Brother Lawrence (1605?-91) was a classic French work of somewhat later date. The most notable German Protestant mystics were Jakob Böhme (q.v.), author of *Mysterium Magnum* ("The Great Mystery"), and Kaspar Schwenkfeld (1489-1561). Mysticism finds expression in the theology of many Protestant denominations and is a salient characteristic of such sects as the Anabaptists (q.v.) and the Quakers (see FRIENDS, SOCIETY OF). In New England, the famous Congregational divine Jonathan Edwards (q.v.) exhibited a strong mystical tendency, and the religious revivals (see REVIVALS, RELIGIOUS) that began in his time and spread throughout the United States during the 19th century derived much of their peculiar power from the assumption of mystical principles, great emphasis being placed upon heightened feeling as a direct intuition of the will of God. Mysticism manifested itself in England in the works of the 17th-century Cambridge Platonists (q.v.); in those of the devotional writer William Law (1686-1761), author of the *Serious Call to a Devout and Holy Life*; and in the art and poetry of William Blake (q.v.).

Contemporary Mysticism. The 20th century has experienced a revival of interest in both Christian and non-Christian mysticism. Early commentators of note were the Austrian Catholic Baron Friedrich von Hügel (1852-1925), the British poet and writer Evelyn Underhill (1875-1941), the American Quaker Rufus Jones (1863-1948), the Anglican prelate William Ralph Inge (1860-1954), and the German theologian Rudolph Otto (1869-1937). A prominent non-clerical commentator was the American psychologist and philosopher William James (see under JAMES) in *The Varieties of Religious Experience* (1902).

In non-Christian traditions, the leading commentator on Zen Buddhism was the Japanese Diasetz Teitaro Suzuki (1870-1966); on Hinduism, the Indian philosopher Savapalli Radhakrishnan (1888-1975); on Islam, the British scholar R(eynold) A(lleyne) Nicholson (1868-1945). The last half of the 20th century saw a marked upswing of interest in Eastern mysticism. The mystical strain in Judaism (q.v.), never lacking, which received particular emphasis in the writings of the Cabalists (see CABALA) of the Middle Ages and in the movement of the Hasi-

dim (q.v.) of the 18th century, was again pointed up by the modern Austrian philosopher and scholar Martin Buber (q.v.). Contemporary mystics of note are the French social philosopher Simone Weil (1909-43), the French philosopher Pierre Teilhard de Chardin (1881-1955), and the American Trappist monk Thomas Merton (1915-68).

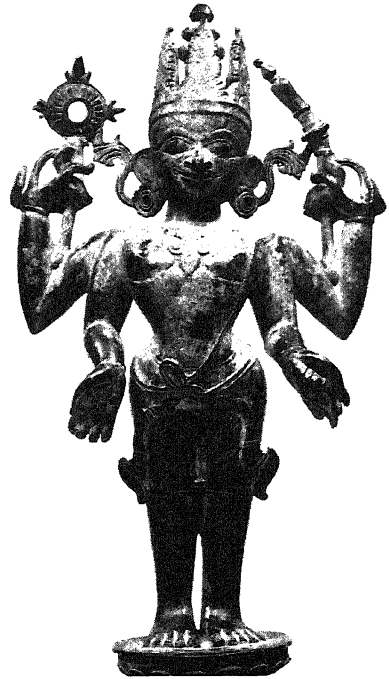
See also BUDDHISM; CHRISTIANITY; GOD; LAMASIM; METAPHYSICS; PLOTINUS; THEOLOGY.

MYTHOLOGY, term applied both to the collected myths of a people and to the scientific study of such myths. A myth is generally defined as a tale of obscure or forgotten origin, fundamentally religious in character, having a supernatural frame of reference and serving to explain or sanctify some concept, usage, institution, or natural phenomenon. Myths are customarily divided into four categories, namely, the culture myth, in which the protagonist (god, demigod, folk hero, or sacred animal) is portrayed as having imparted the domestic and industrial arts to mankind; the etiological myth, in which fictitious events are contrived to account for established ceremonials, practices, institutions, or unusual features of the land, of flora or fauna, or of other natural phenomena so striking as to require special explanation; the nature myth, in which natural and meteorological phenomena are imaginatively treated, particularly with respect to their origins; and the theogonic myth, in which the origin and genealogy of the gods are recounted. The myth is properly distinguished from the legend (q.v.), which, although it may incorporate supernatural elements, is primarily concerned with human beings as well as with the so-called creatures of lower mythology, namely, the denizens of field and plain, of mountain and forest, of the water, and of the air. Myth differs also from the fable (q.v.) and from the folk tale (see FOLKTALES), which, although frequently using supernatural devices, are essentially secular stories based on popular customs and traditions.

Systems of mythology ranging from the simple animistic (see ANIMISM) personification of natural forces to complex, highly developed cosmogonies (see COSMOGONY) have been found in almost every country. Whereas all of these mythological systems have a certain fundamental similarity, each one exhibits the distinctive characteristics of the people by whom it was developed. Thus the love of beauty is a predominant feature of Greek myths; Roman myths idealize the martial spirit and the principles of law and civic order; the myths of India apoth-

size both the beneficent and destructive forces of tropical nature; and in Scandinavian mythology the arctic elements are anthropomorphically portrayed; see ANTHROPOMORPHISM.

Development. The history of mythological thought falls into several successive stages, although frequently the demarcation between these stages is not clearly defined. An excellent illustration of mythology in its rudimentary stage is furnished by the aborigines of central



Vishnu, the Protector, 12th- to 14th-century brass statue from western India. Cleveland Museum of Art - Dudley P. Allen Collection

Australia. Their myths are primarily concerned with the great deeds of illustrious ancestors in the *Alcheringa*, or "time of old". Their only god is a creator who made the world and the semi-human ancestors of the tribes.

The second stage of primitive mythology is devoted to the activities of demons (see DEMON); like the preceding phase, it is characterized by extreme simplicity of conception. A typical situation treated by the myths at this level involves a conflict between a demon and some member of the tribe. The demon is either driven off or slays the tribesman, who then becomes a demon himself. In a still more ad-

MYTHOLOGY

vanced stage of primitive mythology the demon reflects the ethical evolution of the tribe, being no longer mischief-maker but a helper of man. At the stage when demons are the controlling spiritual agency, animal myths are found in their crudest form, often, as in the case of totemic tribes (see TOTEMISM), being identical with ancestor myths. Thus, when the tribe is supposedly descended from an animal ancestor, or the ancestor has been magically transformed into an animal, the two varieties of myth merge. Animal myths exist independently, however, without implied relationships between man and animal.

The zenith of mythological evolution is exemplified in the highly developed cosmogonic myths of such culturally advanced peoples as the Greeks and Romans, centering about anthropomorphic divinities in a well-ordered pantheon. An order of myths frequently found in conjunction with the cosmogonic is that which may be called the quasi-historical, containing idealized accounts of floods, earthquakes, migrations, and settlements.

Theories of Mythology. The first serious inquiry into the origins of myths was made by the ancient Greek philosophers. Their investigations were based on the assumption that myths are allegories which veil deep moral meanings. In the next phase of mythological interpretation, exemplified by the *Sacred History* of Euhemerus, a Greek mythographer of the late 4th century B.C., the theory was advanced that myths are simply distortions of historical events and the gods but deified mortal heroes. Along the same lines, the British philosopher Herbert Spencer (q.v.) attempted to explain the mythology of the Veda (q.v.), the earliest sacred scriptures of the Hindus, as history clothed in the garb of the supernatural. The allegorical and Euhemeristic methods remained the sole interpretive techniques applied to mythology until the 19th century, when scholars began to recognize the necessity of viewing myths in the light in which they appeared to their original audiences. The myths were consequently accepted at their face value and all attempts to discover secondary meaning in them were abandoned. Instead, scholars subjected the best-known mythologies of the Indo-European peoples to a comparative examination. The same myth was frequently found to exist in different forms among different peoples, and although many myths were undoubtedly borrowed by one people from another, the striking affinities between the myths of different Indo-European peoples could be accounted for only on the supposition that they had been handed down from a time when the common

forefathers of those peoples were united in one home, one tongue, and one faith.

Interest in comparative Indo-European mythology has been revived in the 20th century by the French scholar Georges Dumézil (1898–) and his followers in Europe and the United States. Proceeding from the assumptions of the basic function of myths, these workers have studied with great industry and learning bodies of myth in terms of Dumézil's notion of a permeating tri-functional system throughout the Indo-European continuum. The first and most important function was that of the priestly stratum, which, in its mythical representations, sought to maintain a magico-religious and juridical sovereignty. The second function was that of the warrior class, concerned with the maintenance of law and order and the carrying out of the decrees of the priestly caste. The third office was that of the animal and plant husbandman, who provided for the physical well-being of the people and for the perpetuation of the race.

The scientific study of mythology in modern times began with the work of the German philologist Jacob Ludwig Karl Grimm (see under GRIMM). His ideas influenced the philologists Franz Felix Adalbert Kuhn (1812–81), Friedrich Max Müller (1834–98), and other students of language, leading to the foundation of the science of comparative mythology. According to these scholars the Veda contain the Indo-European myths in their earliest form. Müller holds that myths are nature poetry, and that many of them are explicable by the "disease of language", a phrase used to designate the inadequacies of primitive speech that forced the early Indo-European to refer to natural objects as living things. In consequence of this mode of locution, Müller continues, early man came to believe that all nature was endowed with a spirit. The "disease of language", moreover, made it impossible to express a phenomenon of nature except through a simile. When, in course of time, the simile was forgotten, the originally innocent comparison might survive as a repulsive or fantastic myth. Müller's error lies in a too-sweeping application of this theory, in the faultiness of his etymologies, and in his disregard of other causative factors in the genesis of mythology. He is correct, however, in his contention that linguistic misapprehension can make gods. Thus, a Vedic poet writes "Who is the god whom we should revere?" and his question is interpreted by a later generation to be the affirmative statement "Who is god, and oblations should be made to Who". Subsequent writers go still further astray, enjoining the

priesthood to make two separate sets of offerings, one to Who and one to Whom, as distinct deities.

In the so-called folklore interpretation of myths both the Euhemeristic and "disease of language" theories are rejected, the explanation of the later and more highly developed myth being sought in the original concept of the earlier and more primitive one. The account of the brutality of the Greek Titan Cronus (q.v.), for example, is a story paralleled by the tales of many peoples. With the passage of time, such tales are symbolically explained and their crudities eliminated; in origin, however, they are of the type that is simply entertaining to the savage and has no higher function.

According to another mythological theory, of which the Scottish scholar and folklorist Andrew Lang (q.v.) is an exponent, myths are vestiges of a primitive stage of culture through

which all peoples pass and in which they resemble each other. The same influences operating on the same organisms produce like results, a fact as true of the mental and moral aspects of civilization as it is of the material. This interpretation, like the folklore theory, maintains that much in ancient myths which is repellent to modern civilized taste is altogether consonant with the ethical immaturity of primitive man. The gods and heroes of the savage are likewise savages; and the apparent symbolism in mythology is nothing more than a naïve statement of phenomena regarded by the savage as commonplace, such as the birth of men from beasts or from the elements, the birth of animals from women, and the intimate relations between man and his physical environment. Recurring myths among peoples widely separated in space and time were explained in terms of *generatio aequivoca* ("spontaneous generation") or

The unicorn, a symbol of purity and virginity, was also associated in the mythology of the West with the Virgin Mary and Christ, and with the allegory of courtly love. The hunting of the fabulous white animal is a frequent subject of medieval and Renaissance tapestries, as in this early-16th-century tapestry, now at The Cloisters, New York City.

Metropolitan Museum of Art



MYTILENE

"polygenesis", and these same notions were also applied to folk tales and other kinds of folk narrative.

In addition to the functional approach of Dumézil, the study of myth during the 20th century was enlivened by the attempt on the part of some scholars to connect myth with ritual and to regard myth as a reflection of earlier ritual practices. Leader of the ritualists was the Welshman Lord Raglan, who based his theories on the work of such scholars as the British anthropologist Sir James George Frazer (q.v.).

No stereotyped formula can include all the causes and determinants of myths, although each of the foregoing theories is at times applicable. For accounts of the principal mythologies of the world, see the following articles: BABYLONIAN RELIGION; EGYPTIAN RELIGION; GREEK RELIGION AND MYTHOLOGY; INDIAN MYTHOLOGY; ROMAN RELIGION AND MYTHOLOGY. W.D.H.

MYTILENE, ancient Greek city, the capital of Lesbos, or Lésvos (q.v.), an island in the Aegean Sea. It was colonized in early times by the Aeolians and was famed as the birthplace of the poetess Sappho and the philosopher Theophrastus (qq.v.). The city became a great naval power and established colonies in Mysia and in Thrace. After the Persian wars it became an important member of the Delian League (q.v.), but rebelled against Athenian domination in 428 B.C. and was defeated by Athens in the following year. Mytilene fought on the side of Mithridates VI, King of Pontus (see under MITHRIDATES), in his war against Rome (88 B.C.). Very little of the ancient city remains; the modern town is an export center for the island of Lésvos. Pop. (1971 prelim.) 23,447.

MYXEDEMA (Gr. *myxa*, "slime"; *oidema*, "swelling"), or GULL'S DISEASE, deficiency disease caused by insufficient or lack of production of hormone by the thyroid gland (q.v.); see HORMONES. Patients with myxedema complain of fatigue, lethargy, sleepiness, poor tolerance to cold, mental sluggishness, a tendency to gain weight, and generalized aches and pains. Their faces often look puffy and waxy. Their skin is dry and coarse; their hair is coarse, dry, and brittle, and it tends to fall out easily. Often patients also lose the outer portion of their eyebrows. These and other symptoms are caused by a low metabolic rate resulting from a deficiency of the thyroid hormone that stimulates metabolism. Myxedema differs from cretinism (q.v.) in that it develops after birth, and it produces less severe cerebral inadequacy. The disease may occur in several members of a single family. Any condition which can cause a decrease in the elaboration

of the thyroid gland hormone may bring on myxedema. Myxedema is treated by the administration of thyroxine (q.v.) or other thyroid extracts.

L.J.V.

MYXOMYCOTA, phylum of organisms commonly called true slime molds or noncellular (syncytial) slime molds. They are related to the following phyla: Labyrinthulomycota (cell-net slime molds), Acrasiomycota (cellular slime molds), and Plasmodiophoromycota (plasmodiophores). Some authorities include these funguslike organisms in the kingdom Fungi (q.v.); others place them in the kingdom Protista (q.v.), as does the classification followed in this encyclopedia.

The myxomycetes are the best-known, largest, and most abundant slime molds. More than 500 species are found throughout the world. A few species are restricted to tropical areas, but the majority of species are found in temperate climates. They are most active during the warm, moist weather of spring and early summer. Most species are saprophytes (see SAPROPHYTE) and live on dead leaves, decaying wood, and soil.

The life cycle of myxomycetes is relatively complex, consisting of a number of phases. Spores develop in a sporangium, or fruiting body, which may be brilliantly colored and of intricate construction. The sporangia of some species are microscopic; others form large masses. The spores, scattered by wind, germinate on suitable moist substrates, releasing tiny protoplasmic bodies that may assume either of two forms: a highly motile swarm cell with flagella that are used for propulsion in a watery environment, or an amoeboid form called a myxamoeba, which (with flagella retracted) moves by extending its protoplasm in projections called pseudopodia. The myxamoeba feeds on bacteria and other microorganisms, and is capable of transforming itself back into a swarm cell by everting the flagella. Either form constitutes a gamete; fusion of two compatible cells initiates the development of a jellylike phase called a plasmodium, which lacks cell walls and usually grows by repeated nuclear divisions. Plasmodia range in diameter from a few millimeters to several centimeters and may be colorless, white, or any of several bright colors. Plasmodia generally move (or stream) very slowly, with a pulsating motion, engulfing and feeding upon fungal spores, bacteria, yeasts, and other minute particles. Eventually, especially if food is scarce or conditions are dry, the protoplasm of the plasmodium gathers into clumps, cell walls form, and sporangia appear, thus beginning the cycle once more.

P.L.L.

N n

N, fourteenth letter and eleventh consonant in the English alphabet. The letter came from the Latin alphabet, which in turn was based on the Greek alphabet. It was called *nu* by the Greeks, from its Semitic and Phoenician name, *nun*, signifying "fish". *Nun* was derived by the Phoenicians from a character in the Egyptian hieratic alphabet, based upon an Egyptian hieroglyph representing a waterline. The main stages in the development of the modern N may be summarized as follows:



The sound of the letter is produced through the nose by vibrating the vocal cords while the oral passage is closed off by the tongue; in phonetics (q.v.), such a sound is known as a voiced nasal continuant. In English the sound is further differentiated as an alveolar consonant in words such as *now* and *fan*, in which it is formed by placing the tongue against the gums behind the upper teeth, and as a velar consonant in words such as *think* and *mingle*, in which the oral closure is effected by bringing the back of the tongue and the velum, or soft palate, into contact. The velar sound often is spelled *ng*, as in the word *thing*. Some other languages, for example, French, have a dental *n*, produced by placing the tongue against the back of the upper teeth. The *n* sound occasionally has syllabic value when a preceding vowel is not pronounced, as in the words *prison* and *batten*. It is silent after *m* in words such as *solemn* and *hymn*.

As an abbreviation, the capital N is used for the month of November and for terms such as nationalist, navy, north, and Norse. The capital or lowercase N is used on forms and documents to indicate that a name is to be inserted, and also as an abbreviation for nimbus and noon. The lowercase n is used as an abbreviation for

words such as *nail*, *navigation*, *nephew*, *neuter*, *new*, *nominative*, *note*, and *number*.

As a symbol, the capital N is used in chemistry for nitrogen and for Avogadro's number (q.v.), and in nuclear physics for the number of neutrons in a nucleus. In either capital or lowercase form, the letter is used to denote either the thirteenth or fourteenth of an order, class, group, or series. In chemistry it represents a normal-strength solution. The lowercase n is used in mathematics to indicate an indefinite quantity, as in raising a number to the *n*th power; in physics for the principal quantum number or shell number of an electron; and in optics for the refractive index, or ratio of the velocity of light in two different media.

M.P. NABATAEANS or **NABATEANS**, residents of Arabia in Biblical times, from about the 4th century B.C. to the 2nd century A.D. The capital of their kingdom was Petra (q.v.); it extended from the areas known in the Old Testament as Edom and Moab into the Negev (qq.v.). The region is now part of Jordan. See *PALESTINE: History*; *PALESTINIAN ARCHEOLOGY*.

NABLUS, or **NABULUS**, city in the Hashemite Kingdom of Jordan, and capital of Nablus District, in a valley w. of the Jordan R., about 45 miles N.W. of Amman. The city is the trading center for the surrounding region in which grapes, olives, and wheat are grown, and livestock is raised. The chief products of Nablus are olive oil, soap, and wines. In the area are the supposed sites of the tomb of the Hebrew patriarch Joseph (q.v.) and of the well of the Hebrew patriarch Jacob (q.v.). The city was founded in the 1st century A.D. on the site of the ancient city of Shechem. After the Six-Day War between the Arabs and Israel in 1967, Nablus was occupied by Israeli forces. Pop. (1970 est.) 56,846.

NABOKOV, Vladimir (1899-1977), American novelist, poet, and critic, born in Saint Peters-

burg (now Leningrad, U.S.S.R.), and educated at the University of Cambridge. He fled from his homeland after the Russian Revolution. Under the pen name of Vladimir Sirlin, he began writing for the émigré press in Berlin, Germany, where he lived from 1923 to 1937. During the next three years he lived in France, and there



Vladimir Nabokov

Halaman

began to write in English. In 1940 he moved to the United States and five years later became an American citizen. He had a minor literary reputation until the publication in Paris of *Lolita* (1955) made him a major literary figure. The novel recounts the intense and obsessive involvement of a middle-aged man with a sexually precocious young girl, whom Nabokov termed a "nymphet". Having caused a sensation in Europe, the book was published in the U.S. in 1958 and received a similar reception. During the 1960's some of Nabokov's early work in Russian was translated into English and other languages. *Pale Fire* (1962), his first published novel since *Lolita*, was also widely acclaimed. *Speak, Memory*, published in 1966, is a highly evocative account of his childhood in imperial Russia and his later life up to 1940; the memoirs were originally published in 1951 in a shorter form, titled *Conclusive Evidence*. *King, Queen, and Knave*, which was written in Berlin and appeared in Russian and German editions in 1928, was published in an English translation in 1968. *Ada* appeared in 1969 and *Mary* in 1970. *Glory*, first published in 1932, appeared in an English trans-

lation in 1972. In 1973 he published three books: *A Russian Beauty and Other Stories*; *Strong Opinions*, nonfiction pieces; and *Bend Sinister*, a novel.

Nabokov's unique province is the tragicomedy, with time and space telescoped or expanded and metaphors and similes juggled. As he has said, "While I keep everything on the very brink of parody, there must be, on the other hand, an abyss of seriousness . . ."

NACOGDOCHES, city in Texas, and county seat of Nacogdoches Co., about 110 miles N.W. of Beaumont. It is an outgrowth of a Spanish mission, Our Lady of Guadalupe, which was founded in 1716. The city played an important role in the history of the State. It was the site of the 1826 Fredonian Rebellion, an attempt to declare Texas independent of Mexico; see TEXAS: History. One of the earliest schools in Texas was located in Nacogdoches, and today it is the site of Stephen F. Austin State College; founded in 1917. The city is a center of sawmills and small factories. Pop. (1960) 12,674; (1970) 22,544.

NACRE. See MOTHER-OF-PEARL.

NADER, Ralph (1934-), American lawyer and consumer-protection advocate. Born in Winsted, Conn., he was educated at Princeton University and received his law degree from Harvard University in 1958. He has since practiced law in both Connecticut and Massachusetts and has lectured on history and government at the University of Hartford (1961-63) and at Princeton (1967-68). His campaign against questionable manufacturing and design practices in the automobile industry brought him to national attention in the mid-1960's, when he published *Unsafe At Any Speed* (1965, rev. ed. 1972). His work provided the primary impetus for the National Traffic and Motor Vehicle Safety Act of 1966; see AUTOMOBILE: New Developments. Other issues of corporate ethics and human safety to which he has drawn attention include environmental pollution; health hazards in food, medicine, and occupations; fraud; and the secrecy and immunities of large companies. He contributed to the enactment of the Whole-some Meat Act in 1967; see PACKING INDUSTRY.

In recent years he has organized investigative teams of young lawyers, consumer specialists, and students, popularly called Nader's Raiders, to conduct surveys of numerous companies, Federal agencies, and the United States Congress. In 1970 Nader won \$425,000 damages in an invasion-of-privacy suit against the General Motors Corporation, and specified that the money be used to monitor the corporation's future work. He had recently advocated the Fed-

eral chartering of corporations and recommended that corporate officials be personally accountable to the public. *Who Runs Congress?* (1972) is a report of research by members of his Congressional Project, and *The Monopoly Makers* (1973) was produced by his Center for Study of Responsive Law. See CONSUMER EDUCATION AND CONSUMER PROTECTION.

NADIR SHAH, name of two kings, one of Afghanistan, the other of Persia. See AFGHANISTAN: *History: The New Kingdom*; PERSIA: *European Intervention*.

NAGA, city in the Philippines, and capital of Camarines Sur Province, on the island of Luzon, on the Bicol R., 50 miles N.W. of Legaspi. A road junction on a railroad, it is the market center for an agricultural area that produces rice, corn, and abacá fiber. Cement is manufactured in the city. The area was visited by the Spanish in 1573; a settlement called Nueva Cáceres was made on the site of the former native village of Naga. The city was capital of Camarines Province until the province was divided in 1919. Pop. (1970) 79,846.

NAGAOKA, city of Japan, in Niigata Prefecture, on the island of Honshu, on the Shinano R., 35 miles S. of Niigata. A rail junction on the Shin-etsu Line, the city is an industrial center and has oil refineries, textile mills, engineering works, and plants manufacturing machinery, tools, and chemicals. Pop. (1970) 162,262.

NAGARJUNA. See BUDDHISM: *Buddhist Philosophy*.

NAGASAKI, city in Japan, and capital of Nagasaki Prefecture, on Kyushu Island, at the head of Nagasaki Bay, about 140 miles S.W. of Hiroshima. Nagasaki Bay, about 3 mi. long and sheltered on all sides, is one of the best natural harbors of Japan. The city has important coal mining and fishing industries; shipyards and steel works; and plants manufacturing electrical equipment. On Aug. 9, 1945, during World War II, three days after Hiroshima (q.v.) was destroyed, a United States Army Air Force plane released an atomic bomb on Nagasaki. About one third of the city was destroyed and some 66,000 people were killed or injured. A memorial now marks the location over which the bomb exploded. Pop. (1970) 421,000.

NAGOYA, city in Japan, and capital of Aichi Prefecture, on central Honshu Island, on Ise Bay, about 70 miles N.E. of Kyoto. The city is an important port and the transportation center of a major industrial area. The chief manufactures are textiles, aircraft, automobiles, machinery, and chemicals. Nagoya is also noted for cloisonné enamels, pottery, and porcelain. In the city are Nagoya University, founded in 1939, and

Atsuta Jingo, a Shinto shrine. The development of Nagoya dates from 1612, when a castle was built there by the Japanese general and statesman Iyeyasu (1542-1616), the founder of the Tokugawa (q.v.) shogunate. Pop. (1970) 2,036,053.

NAGPUR, city of the Republic of India, in Maharashtra State, and capital of Nagpur District, on the Deccan Plateau, on the Nag R., about 265 miles N. of Hyderabad. It is an important railroad junction and a leading industrial center, with factories manufacturing cotton textiles and textile machinery, dyes, and wood and paper products. Nagpur is also noted for handwoven silk and cotton textiles. In the city are Nagpur University (founded 1923), and Fort Sitabaldi, the site of a battle (1817) in which a small British force defeated a numerically superior Maratha army; see MARATHAS. In the middle of the 18th century Nagpur became the capital of the Maratha kingdom. The city was made the capital of the Central Provinces in 1861, and of newly formed Madhya Pradesh State in 1950. The city and district passed to Maharashtra State in 1960. Pop. (1971 est.) 866,144.

NAGUIB, MOHAMMED (1901-), Egyptian soldier and revolutionist, born in Khartoum, Sudan, and educated at the Royal Military Academy, Cairo. Routine assignments and promotions marked his early military career. He was promoted to the rank of brigadier general following the outbreak (1948) of the Arab-Israeli war, in which he served with distinction as a regimental commander. In July, 1952, Naguib, then a major general, and a group of army officers seized control of the government and forced Faruk I (q.v.) to abdicate. Naguib, who emerged as commander in chief of the army and spokesman for the military junta, gained popular support by promising to eradicate official corruption and to institute agrarian and other reforms. On Sept. 7 the junta made him premier of Egypt. Supreme state authority was vested (Feb. 10, 1953) in a thirteen-member Army Council of the Revolution. In June, 1953, the council proclaimed Egypt a republic. Naguib was named premier and president. He subsequently favored a return to parliamentary rule, a policy which a majority of the council opposed. Gamal Abdel Nasser (q.v.), his deputy, replaced Naguib as premier in April, 1954, and as president in November, 1954. See EGYPT, ARAB REPUBLIC OF: *History: Protectorate and Kingdom; The Republic*. Naguib wrote *Egypt's Destiny: A Personal Statement* (1955).

NAHA, city of the Ryukyu Islands, capital of Okinawa Prefecture, on the S.W. coast of the island of Okinawa, on an inlet of the East China

NAHUATL

Sea, about 400 miles N.E. of Taipei, Taiwan. The city has more than 25 percent of the total population of the islands and is the largest city and chief port, with a free-trade zone. Included in Naha are the "old city", ruined by bombs in World War II (1944); the original port area, at the mouth of the Kokuba R. to the S; and the Tomari port, at the mouth of the Asato R. to the N. The city is the road and rail hub of Okinawa and is connected by steamer with Japan and Taiwan; it exports sugar, fish, pineapples, textiles, and apparel. Industries include sugar, flour, and textile milling, meat packing, fish processing, and the manufacture of lacquerware, baseball gloves, tobacco products, pottery, apparel, electric goods, and ice.

In Naha proper are the Children's Museum (1952), the main business district, and Ono Yama Park. Nearby to the north is Tomari, where the Cultural Center, on the site of the Sogenji Temple, preserves parts of the original gates and walls. The government complex lies in the Mie-bashi section, and the chief executive's residence is in Mawashi, to the E. The original capital, Shuri, is situated to the N.E., but its many historic shrines and royal buildings were destroyed in World War II; remnants are preserved in the Shuri Museum. In Shuri is the University of the Ryukyus (1950), on the site of Shuri Castle, which was built in 1188.

Naha, originally an island village in Naha Harbor, experienced its greatest growth with the port development of the 15th century. The city was visited by Commodore Matthew Calbraith Perry (q.v.) in 1853. In 1879 the Japanese moved the capital from Shuri to Naha, which served as the prefectural capital until 1945, when the city became headquarters for the United States occupation forces; in 1949 it became the center of both the U.S. Military Administration and the Ryukyuan government. Many towns and villages have been annexed to Naha, including Shuri in 1954. In 1972 the Ryukyus were returned to Japan, and Naha again became capital of Okinawa prefecture. Pop. (1971) 276,906.

NAHUATL, language of the Nahua or Aztec (q.v.), constituting, with the languages of related peoples of Mexico and Central America, the Nahuatl branch of the great Uto-Aztecan language family; see AMERICAN INDIAN LANGUAGES: *Classification of Languages*.

The cultural center of the Nahuatl peoples was at the southeastern end of the Mexican plateau in the States of Mexico and Puebla; see Mexico. The best known of these peoples were the Toltec and the Aztec. Nahuatl-speaking peoples extended southward into the States of

Morelos and Guerrero, and westward and northward through the States of Michoacán and Colima, and into the State of Jalisco; they also penetrated to the southeast into the States of Veracruz and Tabasco. These groups were all contiguous. Isolated areas in which Nahuatl languages are spoken exist in the State of Chiapas, and in Guatemala, El Salvador, Nicaragua, and Panama, and represent scattered migrations from the north. Under Aztec dominance Nahuatl speech had a large degree of uniformity, and attained almost complete standardization. Today, Nahuatl remains the mother tongue of more than 500,000 Mexican Indians, and for many more it is a second language to Spanish. **NAHUM**, book of the Old Testament (see BIBLE), in the King James Version. One of the twelve short prophetic books of the Old Testament known, chiefly because of the brevity of each, as the Minor Prophets (see BIBLE, CANON OF THE), it is attributed to the Hebrew prophet Nahum (q.v.). Some modern scholars, however, regard passages in the first chapter that appear to be quite different from the rest (especially Chapters 2-3) as later interpolations. Because Nahum is concerned with the sack of the ancient Assyrian capital Nineveh (q.v.), an event that occurred in 612 B.C., and reflects (3:8-10) on the overthrow of the Egyptian capital Thebes (q.v.) by the Assyrians in 663 B.C., it is generally agreed that the prophecy was made sometime between these two dates. A number of scholars who disagree hold that the book was composed after the sack of Nineveh. A time shortly after the death, about 630 B.C., of the Assyrian king Ashurbanipal (q.v.), when the Assyrian empire began to decline, is now favored; see ASSYRIA.

The first distinctive main part of Nahum (1:2-11) is an unfinished acrostic poem (see ACROSTIC). Roughly half the letters of the Hebrew alphabet are used, each line of the poem beginning with a different letter (the order, however, is not strictly alphabetical). The poem depicts the Lord as a jealous and angry God, Who "will take vengeance on his adversaries" (1:2). But He is a stronghold to those who trust in Him "in the day of trouble" (1:7). The rest of chapter 1 consists of oracles concerning the deliverance of Judah (q.v.) and an oracle of doom (verse 14) directed against Assyria, Judah's oppressor.

The second major part of Nahum (chapters 2-3) is an ode (q.v.) describing the siege and sack of Nineveh. Because of her abominable treatment of other nations, Nineveh is condemned by God (3:4-5) to a destruction as terrible and complete as any she had visited on others. Nor, no matter what she may do, can she

escape this doom; everyone hearing word of her downfall will rejoice (3:8–19).

Nahum seems considerably different in theological emphasis from such books as Isaiah and Jeremiah (qq.v.), in which prophetic wrath against foreign nations is coupled with a predominating concern for the religious (and political) true well-being of Israel (see ISRAEL, KINGDOM OF). Nahum is not, however, concerned exclusively with the fate of Nineveh. God is expressly depicted as universal and all-powerful (1:3–6); and it can be inferred throughout that He is against any wicked nation. The book has obvious literary merit, Nahum ranking with the masters of ancient Hebrew poetry.

NAHUM, (fl. 7th cent. B.C.), Hebrew prophet, only surviving record of whom is the Old Testament book that bears his name (see book of NAHUM). The only fact about Nahum revealed in the book is that he is an "Elkoshite" (1:1). Some scholars believe that Elkosh occupied a site in Judah (q.v.). Although its exact location is uncertain, Saint Jerome (q.v.) advanced a theory, subsequently adopted by many, that Elkosh was in Galilee (q.v.); if correct, the theory may explain the name of the Galilean city of Capernaum (q.v.), which in Hebrew means "city of Nahum".

NAIADS, in Greek mythology, nymphs of brooks, springs, and fountains. Endowed with youth and beauty, they were gifted in music and dancing and the social graces. They were also thought to have healing and prophetic powers.

NAIL, any of various small, rodlike metal fasteners, pointed and often headed or grooved, which are hammered to join or anchor materials. Used chiefly with wood and other building materials, nails are inexpendable elements of carpentry and construction. They are available in lengths of less than $\frac{1}{2}$ in. to several inches, the thinnest being the pinlike insulation-board nail. Designed for specific purposes, they range from plain box nails to fluted masonry nails and dual-head nails. Flat heads make most nails extractable; the common nail, finishing nail, and casing nail, however, are virtually headless. Short, headed nails for shallow impact are usually called tacks. See also SCREW.

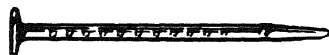
NAILS, in man, flattened, elastic, horny plates, which are protective coverings on the upper surface of the outer segments of the fingers and toes. Each nail consists of a *root*, or part concealed within a fold of the skin; a *body*, or exposed part attached to the surface of the skin; and a free anterior extremity called the *edge*. The skin below the root and body of the nail is termed the *matrix*, the part that produces the

nail. The matrix is thick, and covered with highly vascular papillae, and its color is seen through the transparent horny tissue. Near the root the papillae are smaller and less vascular; thus the portion of nail corresponding to this part is of a whiter color. From its form this portion is termed the *lunula*. It is by the successive growth of new cells at the root and under the body of the nail that it advances forward, and maintains a due thickness which, at the same time, ensures its growth in a proper direction.

NAIRN, Great Britain, county of Scotland, bordered on the N. for some 10 mi. by the Moray Firth. The N. coastal region, which is a fertile farm belt, rises to a hilly area in the S. The county is drained by the Nairn and Findhorn rivers. Barley, oats, and potatoes are grown and livestock is raised. The chief industries of Nairn are granite and seaweed processing, whisky distilling, and brick manufacturing. The chief town and county seat is Nairn, which is the center of a well-known resort area, with bathing beaches and golf courses. Much of the county, including Cawdor Castle, was the setting for *Macbeth*, by



Brush Pin



Duckbill Point Box Nail



Double Pointed Pin



Escutcheon Pin



Weatherstrip Nail



Drive Nail



Picture Hanger Nail

Examples of commonly used nails in actual size.

Baker Nail Co.

NAIROBI

William Shakespeare. Area, 163 sq.mi.; pop. (1971) 11,052.

NAIROBI, city and capital of Kenya, in Nairobi District, about 260 miles N.W. of Mombasa. The city is on the Athi Plains, more than 5500 ft. above sea level, at the foot of the Kikuyu Escarpment. The city has extensive rail and highway connections, and its international airport is one of the busiest in Africa. Nairobi is visited by large numbers of sportsmen from all parts of the world, attracted by big-game shooting for which the country is famous. The trade center of the surrounding agricultural area, in the city are plants producing chemicals, foodstuffs, furniture, glass, and soap. Institutions of higher learning include several colleges and a music conservatory. Nearby is the Nairobi National Park, a game reserve. Founded as a railroad camp in 1899, Nairobi was rebuilt in the 1920's and today is a modern city. It was made the capital in 1963 when Kenya became independent. Pop. (greater city; 1970 est.) 535,200.

NAISMITH, James (1861–1939), Canadian-American teacher of physical education, born in Almonte, Ontario, and educated at McGill University and Presbyterian College in Montréal. From 1887 to 1890 he taught physical education at McGill University, and from 1890 to 1895 at the Young Men's Christian Association Training School (now Springfield College), Springfield, Mass. In 1891, aided by the American specialist in physical education Luther Halsey Gulick (1865–1918), he invented basketball (q.v.) as an indoor sport. Naismith later studied at Gross Medical College (now part of the University of Colorado). He was director of physical education at the Y.M.C.A. in Denver, Colo. (1895–98), and at the University of Kansas (1898–1937).

NAKHON RATCHASIMA, city in Thailand, on the Mun R. and the Khorat Plateau, 140 miles N.E. of Bangkok. The fourth-largest city of the country, it is the road, rail, and trade center of the northeastern region. The city developed after the arrival of the Khorat (or Northeast) rail line in 1900 and now has railroad workshops, rice and sugar mills, and textile-weaving industries. It also trades in the products of the province, which include rice, livestock, corn, silk, tobacco, cotton, hides, and skins. The city is the site of a technical institute and a teacher-training center. On the Mun R. nearby are several irrigation projects. The modern city has spread beyond the original old walls. Founded in the 17th century during the Ayutthaya era, the city was formerly called Khorat or Korat and is now also called Nakon or Najor Rajasima or Rajsima. Pop. (1970 prelim.) 102,095.

NAMANGAN, city of the Soviet Union, in Uzbek S.S.R., in the Fergana Valley, 135 miles E. of Tashkent. The city is situated in a fertile, irrigated region growing cotton, fruit, silk, grapes, grain, and livestock. It is on the Fergana Valley Railroad, and its industries include cotton and silk milling, cottonseed-oil processing, tanning, food processing, and wine making. The city was formerly the capital of Namangan Oblast, which was dissolved in 1960. Pop. (1970) 175,267.

NAMATH, Joe, in full JOSEPH WILLIAM NAMATH (1943–), American athlete, born in Beaver Falls, Pa., and educated at the University of Alabama. A quarterback, Namath was signed to a contract with the New York Jets, a professional football team, in 1965. He played a major role in the Jets' victory in the Super Bowl game of 1969, making the Jets the 1968–69 world champions of professional football. Namath was awarded the 1969 S. Rae Hickok award as the professional athlete of the year. Also in 1969 he began an off-season career as an actor, appearing in the motion pictures *C.C. and Company* (1970) and *Norwood* (1970). He retired from football in 1978.

NAM DINH, city in Vietnam, and capital of Nam Dinh Province, on a canal between the Coi and Dai rivers in the Red R. Delta, 50 miles S.E. of Hanoi. Nam Dinh is a road hub on a railroad and is the center of the silk and cotton industries of N. Vietnam. Besides spinning and weaving plants, it has jute-milling, saw-milling, salt-extracting, and distilling industries. Nam Dinh is also a center of Annamese culture. Pop. (latest census) 86,132.

NAMES, word standing for and differentiating between special and tangible things either living, as in the case of a person or animal, or inanimate, as in the case of a place or concept. Names are never generic even when several have been fused into one word or when one name is shortened to a nickname. It is likely that naming began with the utterances of simply natural sounds. Psychological sound patterns can be linked to names. "Aaa" must have been an early one and is recognizable as a desire for activity or to overcome frustration or pain, whereas "Ooo" suggests a soothing, loving, or quieting response. Even single and grouped letters can convey emotional meaning. "D" becomes a determined or stubborn symbol; "Am" or "Ma" indicates "mother" in almost every language. Hebrew names such as James (supplanter), and Elizabeth (oath of God) sprang from an idea. Early Christians took names from the Bible to symbolize their new life. Most personal and place names evolved from topograph-

ical features such as the early English words bank, combe, don meaning town; edge, field, ford meaning wood; ing and lee meaning meadow; ridge meaning village; and well meaning spring. Combinations of these and other words differentiated between similar places. Children of ancient times were named after their birthplaces as well as for physical characteristics such as long, small, and slender. The early Christians derived many first names from Greek, Latin, Celtic, and Teutonic. German tribes linked two elements together to show a grammatical relationship. Roger was a combination of fame and spear. Some combined the first syllables of the first names of both parents, like "Wulf-stan", the name of the bishop of Worcester. Personal names were also adopted from royal houses: Louis (France), Henry, Edward, George (England), Frederick (Germany) and Charles (Sweden). The paucity of first names after the Norman Conquest produced a variety of nicknames like Rick (Richard), Jack (John), May (Mary) and Harry (Henry). First names of the Middle Ages used the diminutive kin, cock, in, and on which changed John to Jockin and Jenkin, William to Willin and Robert to Robin—our equivalent to Johnnie, Willie or Alison meaning "little". English Puritans reverted to Old Testament names like Elijah, Moses, Aaron, Joshua, Priscilla, and Sarah as well as carrying over names that expressed some constructive end like Grace, Faith, Hope, and Charity.

English Origins. An English work, published in 1605, states that surnames were derived from occupational titles of the French medieval manor because last names were scarce. This system produced Stewart (steward), Bailey (bailiff), and Sargeant (sergeant). Before the conquest clerical marriages were common and many children of such unions were named Priest, Deacon, Rector and Vicar after the calling of their father. The European nobility, late in the 13th century, were the first to use surnames in order to establish hereditary families. The eldest son and daughter took the names of the principal estates of their parents, while younger ones adopted names of lesser holdings. The servants of church officials took the names Bishop or Prior where previously they had been known as "the bishop's" or "the prior's man". The 13th and 14th century London apprentices sometimes dropped their own real surnames and assumed the surnames of their masters or took early occupational ones like Cowper (cooper) and Baxster (bake-stir), while Goldsmith, Weaver, Skinner and Baker evolved from later trades. The early Anglo-Saxon word "mann"

meant "servant" and employers' last names like Wat and Harry were turned into Watmann and Harrimann or the "servant of Wat or Harry". In a similar way, "Ellis's son" became Ellison for a male child. Newcomers to an area who were owners or employees of taverns and inns often grafted the symbol of their shops onto their first name like "John att (of the) Boar's Head" or "James att Cock". Others adopted a specific place name such as John Surrey (John of Surrey), Scott (Scotland), Fleming (Flanders). Last names such as Green, Wood, Hall, Hill and Moore also were derived from non-specific geographical locations. In the 15th and 16th centuries, pagan names were revived, thus, Diana, Venus, Ulysses, and Alethea (truth), Sophia (wisdom), and Irene (peace), were taken from the Greek.

American Names. Many American names are of English Puritan origin, with Smith and its variants being the most popular in both countries. The highest surname count in the United States runs to 154,750 minus the variant spellings of the same name. The chief sources of last names come from hair color or complexion: Fairchild, Blackhead and Brown; the size of a person or extremity: Tallman and Longhead; birdlife: Finch, Peacock; fish: Fish; Whiting; weapons: Gunn, Spearshot; kitchen utensils: Pitcher, Spoon; and from occupations: Farmer, Carpenter, Archer, and Constable. First names are also derived from flowers: Daffodil, Dahlia, Rose, and Violet were popular in the 1850's; from vegetation: Hazel, Ivy, and Myrtle; and from precious stones: Ruby, Opal, and Jasper. The first and middle names of many American children were taken from the surnames of the founding fathers. Negro slaves generally adopted one or both names of famous Americans, and added them to their first name, like George Washington Carver, or took the last name of their owners. Place names in America sprang from Indian tribe names like Niagara and Potomac. Two distinct developments in naming in America were the misspellings of older names because of frontier illiteracy and the adoption of English names by non-English immigrants.

NAMPÁ, city of Idaho, in Canyon Co., near the Boise R. about 20 miles w. of Boise. The city is included in the Boise Project, which placed approximately 350,000 acres under irrigation, and is a processing, shipping, and commercial center for this agricultural and dairy region. It is the site of Northwest Nazarene College, founded in 1913. Pop. (1960) 18,897; (1970) 20,768.

NAMP'Ō. See CHINNAMP'Ō.

NAMPULA, town in Mozambique, and capital of Nampula Province, 95 miles w. of Moçam-

NAMUR

bique. It is on a railroad that runs E. to the port of Lumbo, on Mozambique Channel opposite the island and town of Moçambique. Nampula is a trade center in an area producing cotton, vegetables, corn, peanuts, and forest products. Pop. (1970) 126,126.

NAMUR (Fl. *Namen*), city in Belgium, and capital of Namur Province, at the confluence of the Sambre and the Meuse rivers, about 35 miles S.E. of Brussels. A transportation and manufacturing center, its chief products include cutlery, glassware, iron and brass goods, leather goods, and machinery. Strategically situated at the confluence of two rivers and just N. of the Ardennes plateau, Namur underwent many sieges during the 17th and 18th centuries. The city was the scene of intense fighting during World War I and was captured by German troops in 1914. During World War II Namur was badly damaged by the Germans. Pop. (1970 est.) 32,507.

NANCHANG, city and seaport in the People's Republic of China, and capital of Kiangsi Province, on the Kan R., about 400 miles S.W. of Shanghai. A major transportation center, the city has an airport and is served by several railroads. A traditional center of porcelain and glass production, Nanchang's modern industrial region produces chemicals, farm implements, light machinery, matches, paper, and soap. Nanchang is the shipping center for the surrounding region in which hemp, rice, tea, and tobacco are produced. An old walled city, Nanchang dates from the 12th century. For a short time in 1927 Communist troops established the first Soviet republic in China. During World War II the city was occupied by the Japanese from 1939 to 1945. Nanchang was captured by Communist forces in 1949. Pop. (1970 est.) 900,000.

NANCHUNG, city in the People's Republic of China, in Szechwan Province, at the head of navigation on the Kialing R., 90 miles N.W. of Chungking. A trade center of a region producing cotton, silk, tung oil, tobacco, salt, beans, grains, and sweet potatoes, its industries include silk milling, cotton spinning and weaving, and the manufacture of hog bristles. The name is also spelled Nan-ch'ung. The city was called Shunking before 1913. Pop. (1970 est.) 275,000.

NANCY, city in France, and capital of Meurthe-et-Moselle Department, in the ancient province of Lorraine (q.v.), about 175 miles E. of Paris. The surrounding region has rich iron fields and contains many industrial towns. The chief industries of Nancy include publishing, and the manufacture of chemicals, clothing, furniture, iron and steel, and metal goods. Points of interest in Nancy include many fine examples of 18th

century architecture; the Place Stanislas is lined with buildings dating from this period. The ducal palace, constructed in the 16th century, today houses a historical museum. In the 15th-century Church of the Cordeliers are tombs of several of the dukes of Lorraine (q.v.). The city is the seat of a bishopric and of the University of Nancy, which was founded in 1572.

The city developed around a castle of the dukes of Lorraine, who made Nancy their capital in the 12th century. Near Nancy, in 1477, Charles (q.v.), Duke of Burgundy, known as Charles the Bold, was defeated and killed by Swiss forces after an unsuccessful attempt to restore the former kingdom of Burgundy (q.v.). Between 1633 and 1697 the city was held by the French, but in the latter year was given back to Leopold, Duke of Lorraine (d. 1729). The Duchy of Lorraine was granted in 1737 to Stanislas I Leszczyński (q.v.), who had lost the throne of Poland as a result of the War of the Polish Succession (1733-35); he held court in Nancy and made the city one of the most splendid in Europe. After the death of Stanislas in 1766, the city came under French control. After the Franco-German War of 1870-71, Nancy was occupied by German troops. During World War I the city was unsuccessfully attacked by the Germans in 1914 and several times bombarded. It was taken by the Germans in 1940, during World War II. Pop. (1968) 123,428.

NANGA PARBAT, mountain peak in W. Himalaya (q.v.), 26,660 ft. high, one of the highest peaks in the world, situated in Jammu and Kashmir State, N.W. India, about 80 miles N. of the city of Srinagar. Nanga Parbat is considered the most treacherous of the Himalaya, and a large number of fatalities among climbers have occurred. It was finally scaled in July, 1953, by a German-Austrian expedition.

NANKING (Chin., "Southern Capital"), formerly CHIAN-NING or KIANG-NING, city in the People's Republic of China, and capital of Kiansu Province, on the Yangtze R., about 175 miles N.W. of Shanghai. A major river port, the city is also served by several airlines and railroads. The chief manufactures include cement, electrical equipment, textiles, and machine tools. Famed as a cultural center, Nanking is the site of Nanking University, founded in 1902, several colleges and research institutes, museums, and libraries. Places of interest include remnants of a wall that formerly encircled the city; the tombs of the early Ming rulers; and the mausoleum of Sun Yat-sen (q.v.), founder of the Republic of China.

Originally known as Ginling, the city was

founded late in the 3rd century B.C. It was renamed several times in subsequent centuries. In 1368 the first ruler of the Ming dynasty made the city his southern capital, hence its present name. The imperial court was removed to Peking (northern capital) in 1403. In 1664, when the Manchu dynasty began to rule, the city was officially designated Chian-ning, but Nanking persisted in popular usage. The Treaty of Nanking, by which Great Britain obtained control of Hong Kong, was signed there in 1842. Large sections of Nanking and some of its most distinctive landmarks were destroyed in 1853, during the Taiping Rebellion (q.v.). In 1912 Nanking was briefly headquarters of the provisional presidency of the newly formed Republic of China.

Nanking was the capital of China from 1927 until 1937, when it was seized by the Japanese. The capture of the city was accompanied by such atrocities that it became notorious as the "Rape of Nanking". Following the defeat of Japan in 1945, at the close of World War II, Nanking was again made the capital. It was captured in April, 1949, by the Chinese Communists, who removed the seat of government to Peiping (now Peking). Pop. (1970 est.) 2,000,000.

NANNING, formerly YUNNING, city in the People's Republic of China, and capital of Kwangsi Chuang Autonomous Region, on the Yü R., about 330 miles s.w. of Canton. A commercial center, the city is served by several railroads and is connected by highway with many other cities. Agricultural crops from the surrounding area include aniseed, cotton, groundnuts, maize, rice, and sugarcane. In Nanning are sugar mills, tanneries, and plants producing foodstuffs, paper, textiles, tobacco products, and wood oil. The city was open to foreign trade in 1907. During World War II Nanning was held by Japanese forces but was retaken in 1945. Pop. (1970 est.) 375,000.

NANSEN, Fridtjof (1861–1930), Norwegian explorer, scientist, statesman, and author, born in Store Frøen. He explored Greenland in 1882 and again in 1888, recording his experiences in *The First Crossing of Greenland* (1890) and *Eskimo Life* (1891). From 1893 to 1896 he engaged in exploration of the Arctic Regions, attaining 86° 14' N., the most northerly point reached up to that time. The ship he used during this expedition, called the *Fram*, was specially constructed to withstand the great pressure of ice. This journey he described in *Farthest North* (1897) and *The Norwegian North Polar Expedition* (6 vol., 1900–06). See ARCTIC, THE: *Exploration of the Arctic Regions*.

In 1905 Nansen took part in the movement that led to the peaceful separation of Norway and Sweden and served (1906–08) as the first Norwegian minister to Great Britain. From 1910 to 1914 he engaged in various explorations in the North Atlantic Ocean, Arctic Ocean, and Siberia. In 1917 he headed a commission to the United States to arrange various commercial



Fridtjof Nansen

UPI

agreements and in 1918 was a delegate to the Assembly of the League of Nations (q.v.). He arranged for the repatriation of war prisoners in 1920, and from 1921 to 1923 he had general charge of the Red Cross famine relief in the Volga and South Ukraine regions of Russia. For this latter work he received the 1922 Nobel Peace Prize. In 1927 he represented Norway on the disarmament committee of the League of Nations. The League honored him by creating (1931) the Nansen International Office for Refugees, which won the 1938 Nobel Peace Prize; see REFUGEE.

He wrote, in addition to works already mentioned, *The Oceanography of the North Polar Basin* (1902); *Through Siberia, the Land of the Future* (1914); *Spitzenbergen* (1922); and *Armenia and the Near East* (1928).

NANSEN INTERNATIONAL OFFICE FOR REFUGEES. See NANSEN, FRIDTJOF.

NANTERRE, city in France, and capital of Hauts-de-Seine Department, on a bend of the

NANTES

Seine R., 7 miles n.w. of the center of Paris. It is the site of foundries, rail yards, and plants manufacturing automobiles, chemicals, electrical equipment, paint, fountain pens, toys, hosiery, food products, and perfumes. The city, at the n. foot of Mt. Valérien, is the traditional birthplace of Sainte Geneviève (q.v.), the patron saint of Paris, to whom the basilica here is dedicated. Pop. (1968) 90,632.

NANTES, city in France, and capital of Loire-Atlantique Department, on the Loire R., 35 mi. from the sea, to which it is connected by canal, and about 210 miles s.w. of Paris. The city is an important industrial and shipping center. The chief industries of Nantes include oil and sugar refining, shipbuilding, and the manufacture of fertilizer, foodstuffs, soap, sugar, and paper. Many of the manufactured products, such as oil and sugar, are imported as raw materials and processed for export. The chief community of the Gallic tribe of the Namnetes, it became an important administrative center of the Romans. In the 17th and 18th centuries Nantes became an important port. The city was occupied by the Germans during World War II. Pop. (1968) 259,208.

NANTES, EDICT OF. See EDICT OF NANTES.

NANTUCKET ISLAND, island of the North Atlantic Ocean, forming, with two small nearby islands, Muskeget and Tuckernuck, Nantucket Co., Mass. Nantucket Island is about 25 miles s. of Cape Cod from which it is separated by Nantucket Sound. The island is crescent-shaped and is about 14 mi. long and between 3 and 6 mi. wide. The surface is generally sandy and undulating, with excellent beaches. The county seat and chief community is the town of Nantucket, which is coextensive with the county. Other communities include Siasconset, Wauwinet, Quidnet, and Squam Head. Catering to summer vacationists is the chief economic activity. Nantucket Island was discovered by the English explorer Bartholomew Gosnold (q.v.) in 1602. It was settled in 1659 by Quaker colonists and belonged to New York until 1692 when it was made a part of Massachusetts. During the 17th and 18th centuries the island was the base for prosperous whaling operations. Area of county, 46 sq.mi.; pop. (1960) 3559; (1970) 3774.

NAPA, city in California, and county seat of Napa Co., at the head of navigation on the Napa R., 35 miles n. of Oakland. The city is the shipping center for the Napa Valley, which produces grapes, wine, fruit, livestock, dairy products, poultry, and stone. Napa has fruit-processing and tanning industries and manufactures building materials, apparel, rock products, and

gloves. Napa College (1942; junior college) is situated here, and mineral springs lie nearby. Named for a local Indian tribe, the town was planned in the 1840's. The city was incorporated in 1872. Pop. (1960) 22,170; (1970) 35,978.

NAPALM. See CHEMICAL WARFARE.

NAPERVILLE, city of Illinois, in DuPage Co., on the DuPage R., about 28 miles w. of central Chicago. The city has varied manufacturing. It is the site of North Central College, founded in 1861, and of the College of DuPage, established in 1966. Pop. (1960) 12,933; (1970) 23,885.

NAPHTHA, term applied to several volatile, inflammable liquids, obtained by distillation (q.v.) of various organic materials and used as a solvent for fats, gums, and resins, particularly in the manufacture of varnishes and waxes and in the dry cleaning of textiles. Petroleum naphtha, or mineral naphtha, is obtained from petroleum as a crude distillate which is lighter than kerosene and has a lower boiling point. It contains a mixture of methane-type hydrocarbons. The distillates with lower boiling points than petroleum naphtha are called ligroin (q.v.). Other forms of naphtha are crude naphtha, obtained from coal tar; shale naphtha, obtained from shale; and wood naphtha, obtained from wood. Solvent naphtha, used for dissolving rubber, is a high-boiling-point fraction distilled from coal tar.

NAPHTHALENE, white, crystalline hydrocarbon, with formula $C_{10}H_8$, m.p. $80.2^{\circ} C.$ ($176.4^{\circ} F.$), b.p. $217.9^{\circ} C.$ ($424.2^{\circ} F.$). One of the important constituents of coal tar, naphthalene sublimes readily, is insoluble in water but is soluble in alcohol, ether, and other organic solvents. It has a peculiar, penetrating odor. Structurally, naphthalene contains two benzene rings fused together through two adjoining carbon atoms. Like benzene (q.v.), it reacts with other substances to form many derivatives. Naphthalene is used extensively in the manufacture of dyes and explosives. It is also used in the moth-repellent preparations called moth balls, but has been largely replaced for this purpose by paradichlorobenzene. See AROMATIC COMPOUNDS; HYDROCARBONS.

NAPIER, John or NEPER, John, Laird of Merchiston (1550–1617), Scottish mathematician, born in Merchiston Castle in Edinburgh, and educated at the University of Saint Andrews. He became an adherent of the Reformation (q.v.) movement in Scotland while still at college, and in later years he took an active part in Protestant political affairs. He was the author of *A Plaine Discovery of the Whole Revelation of Saint John* (1593), the first important Scottish Biblical interpretation. He is best known, however, as the in-

ventor of the first system of logarithms, described in *Canonis Descriptio* (1614) and based upon the correspondence of a geometrical and arithmetical series of numbers. The common and natural systems of logarithms used today do not employ the same base as Napier's logarithms, although natural logarithms are sometimes called Napierian logarithms; see LOGARITHMS. Napier was one of the first, if not the first, to use the decimal point in expressing decimal fractions in a systematic way and according to the modern system of decimal notation. He also invented mechanical systems for performing arithmetical computations, described in *Rabdologia* (1617). See DECIMAL SYSTEM.

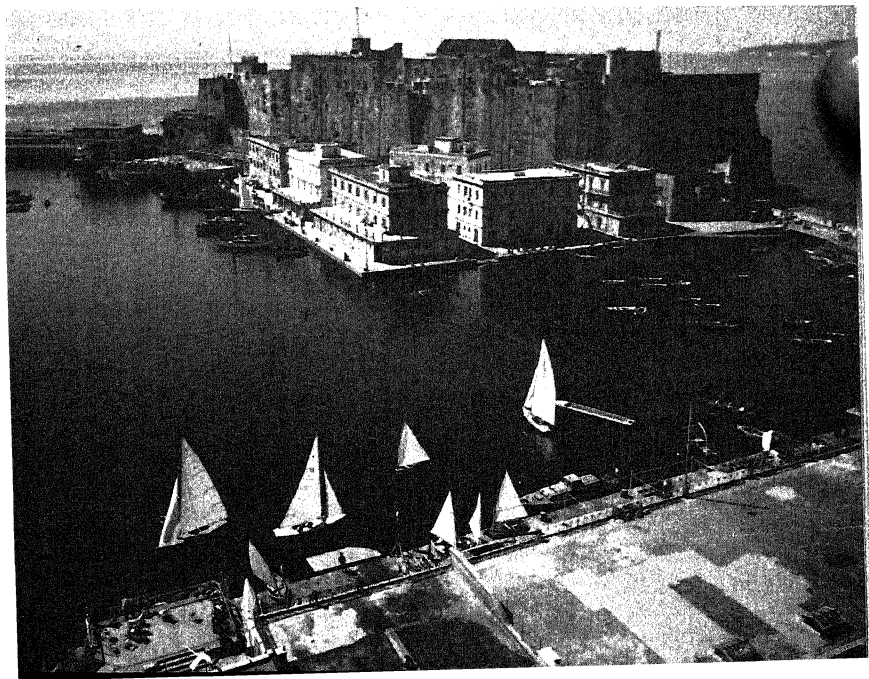
NAPLES (It. *Napoli*; anc. *Neapolis*), city and seaport in Italy, and capital of Naples Province, about 120 miles S.E. of Rome. Naples is the third-largest city in Italy and, after Genoa, the leading port. The city is built on the slopes and at the base of a range of hills bordering the Bay of Naples (see NAPLES, BAY OF), an inlet of the Tyrrhenian Sea. Visible from the city is the volcano Vesuvius (q.v.). Naples has a large harbor for passenger and merchant vessels and several smaller harbors that accommodate fishing and pleasure craft. Among the chief industries are tourism, shipbuilding, and the manufacture of chemicals, foodstuffs, gloves, iron and steel, and machinery.

Naples is the site of numerous castles and other places of interest. On a rocky islet connected to the city by a causeway stands the 12th-century Castel dell'Ovo, the site of which was occupied in antiquity by the villa of the Roman general Lucullus (q.v.). Other Neapolitan castles are the 13th-century Castel Nuovo, situated on the harbor, and the 14th-century Castel Sant' Elmo, on a hill overlooking the city. The former royal palace in Naples, the Palazzo Reale, was built in about 1600 and restored in 1837; it houses the notable National Library, which has a large and valuable collection of books and manuscripts. Near the palace is the San Carlo Opera (1737), famed for its productions and one of the largest theaters in Europe. The National Museum in Naples is renowned for its vast collection of Greco-Roman paintings and sculpture found in Pompeii, Herculaneum (qq.v.), and elsewhere in the vicinity of the city. The museum contains also the celebrated Farnese collection of paintings. The city is the site of a university, founded in 1224; Naples also has a naval institute, a school of foreign languages, a music conservatory, and an academy of fine arts.

Of the many ecclesiastical edifices in the city, the best known is the Cathedral of San Gennaro, built in the 13th century. The cathedral contains

The Castel dell'Ovo in the harbor of Naples.

Italian Government Travel Office



NAPLES, BAY OF

the tomb of Saint Januarius, the patron saint of the city; crowds throng the cathedral in May and September to witness the miraculous liquefaction of a substance believed to be his blood. Other Neapolitan churches dating from medieval times are San Giovanni a Carbonara, Santa Maria del Carmine, Santa Chiara, and Monte Oliveto (or Sant'Anna dei Lombardi). The Church of San Domenico Maggiore has a beautiful interior and is rich in sculpture and frescoes. Beside it stands the former Dominican monastery in which Saint Thomas Aquinas (q.v.) once lived and taught. The former Monastery of Certosa di San Martino, built in the 14th century and rebuilt in the 17th century in the style of the baroque (q.v.), has been converted into a museum. In the city is also the grave of the famous singer Enrico Caruso (q.v.), who was born there. **History.** The ancient *Neapolis* (Gr., "New City") was originally a Greek settlement. Although conquered by the Romans in the 4th century B.C., it long retained its Greek culture. The mild climate and the beauty of the site made the city a favorite resort of wealthy Romans. After the fall of the Western Roman Empire (see HOLY ROMAN EMPIRE) in the 5th century, the city declined. In the 6th century Neapolis was captured by forces of the Byzantine Empire (q.v.); and in the 8th century it became an independent duchy. In 1139 the Normans conquered the duchy, and it was subsequently incorporated into the Kingdom of the Two Sicilies; see SICILY: *History*.

After the absorption of the kingdom into the modern state of Italy in 1861, the port of Naples was greatly improved. The city, which had long been subject to epidemics of cholera (q.v.), was provided with a pure supply of water in 1884 and a new sewage system.

During World War II (q.v.) Naples was bombed repeatedly by the Allies until its capture in 1943; it was heavily damaged also by the retreating Germans. The harbor and some sections were virtually demolished and many houses were rendered uninhabitable. Reconstruction was based on a plan designed to make Naples more sanitary and modern. Pop. (greater city; 1970 est.) 1,277,438.

NAPLES, BAY OF, inlet of the Tyrrhenian Sea, on the S.W. coast of Italy. It is about 20 mi. in length from Cape Miseno on the N.W. to Punta della Campanella on the S.E., and about 10 mi. in breadth. The most important city on the bay is Naples (q.v.). The islands of Ischia and Capri are at the entrance. The volcano Vesuvius and the ruins of Pompeii (qq.v.) are on the E. shore of the bay.

NAPOLÉON I, original name, in Italian, NAPOLEONE BUONAPARTE, French form, used after 1796, NAPOLÉON BONAPARTE (1769–1821), Emperor of the French (1804–14; March to June, 1815), born in Ajaccio, Corsica, the son of Carlo Buonaparte (1746–85) and Maria Letizia Buonaparte (1750–1836). One of eight children in an impoverished noble family, Napoléon Bonaparte maintained throughout his life a keen sense of family obligation. He was educated in French military schools at Brienne-le-Château and Paris. In 1785 he was commissioned a second lieutenant in the artillery. In 1793 he commanded the French republican artillery forces in the French siege of Toulon, which had been occupied by the British with the help of Royalists in the course of the French Revolution (q.v.), his artillery was decisive in driving the British out of the city, and he was promoted to brigadier general. In 1795 his artillery dispersed with grape-shot a rebellious force of Parisian royalists seeking to block the installation of the Directory (q.v.), the French government at the time. The Directory made him commander of the Army of the Interior and in 1796 sent him to northern Italy to fight the Austrians; this campaign was part of the War of the First Coalition, which had begun in 1793 (France against Austria, Prussia, Great Britain, Spain, Holland, and Sardinia; after 1794, against Austria, Great Britain, and Sardinia). Immediately before his departure Bonaparte married Joséphine de Beauharnais (see under BEAUHARNAIS), the widow of Alexandre, Vicomte de Beauharnais (1760–94).

Napoleon's Italian campaign (April, 1796, to October, 1797) was brilliantly successful. He first defeated the Sardinians in a number of battles and forced their king to sign an armistice. Bonaparte then defeated the Austrians at Lodi (May 10, 1796), captured Milan, won additional victories at Arcole (Nov. 15–19) and Rivoli (Jan. 14, 1797), and took Mantua (Feb. 2). On April 18 Austria agreed to preliminaries of peace at Leoben, Austria, and on Oct. 17 signed the Treaty of Campoformio, which added the Austrian Netherlands (present-day Belgium) to France and extended French territory and influence elsewhere; the latter result was achieved chiefly by the establishment of republics, such as the Cisalpine Republic (q.v.) in Lombardy, the governments of which were modeled on that of France.

On his return to France in November 1797, General Bonaparte prepared to invade Great Britain, the leader of the coalition opposing France, but he abandoned the plan because of inadequate French naval capability. Instead he



Napoleon meeting with Holy Roman Emperor Francis II after the Battle of Austerlitz in 1805. Bettmann Archive

attacked British colonial interests in the Middle East by invading Egypt. The French expedition sailed from Toulon on May 19, 1798, and landed at Alexandria on July 1. In Egypt Bonaparte defeated the Egyptian forces in the Battle of the Pyramids (July 21) and then captured Cairo, but the French fleet, which had brought the army to Egypt, was destroyed by the British fleet under Admiral Horatio Nelson (q.v.) in the Battle of the Nile (Aug. 1–2, 1798). Although his line of communications with France was thus cut off, Bonaparte still sought to extend French influence in the Middle East by invading Syria. He was successful until he attacked the seaport Acre, defended by a British squadron under Admiral Sidney Smith (1764–1840). Bonaparte returned to Egypt and defeated a Turkish force at Abukir (now Abu Qir Bay) on July 25, 1799. He realized, however, that his position in Egypt was untenable. Meanwhile a Second Coalition of European powers, consisting of Great Britain, Austria, and Russia, had almost reconquered northern Italy. At this point Bonaparte abandoned his beleaguered army and slipped through British lines on Aug. 24. He reached France on Oct. 8, still remembered as the hero of the Italian campaign.

Formation of Consulate. He took immediate action in both domestic and foreign affairs.

Aided by Emanuel Joseph Sieyès (q.v.), one of the members of the Directory, and his brother Lucien Bonaparte (see under BONAPARTE), Napoléon Bonaparte engineered the coup d'état of the 18th Brumaire (Nov. 9, 1799); this sudden seizure of power overthrew the Directory and established in its place a new form of government for France, the Consulate (q.v.). The executive power was thereafter vested in three consuls, including Bonaparte; he dominated the Consulate from its beginning, becoming first consul on Dec. 24, 1799, and first consul for life in 1802. He was equally successful in meeting the new military threats to France. Raising a new army, he marched over the Alps into Italy, recaptured Milan, and decisively defeated the Austrians at the Battle of Marengo (June 14, 1800). A few months later one of his generals, Jean Victor Moreau (1763–1813), defeated the Austrians at Hohenlinden, Bavaria, and forced them to sign the Treaty of Lunéville (Feb. 9, 1801). The British acknowledged the defeat of the coalition by signing the Treaty of Amiens (March 27, 1802). By the terms of the treaties France further extended its boundaries, to the south and the east, regaining dominance of Italy.

NAPOLÉON

Within France itself Bonaparte consolidated or modified certain French revolutionary reforms, while discarding or undoing others. Most characteristic was the creation of highly centralized, authoritarian institutions, notably in local administration (the prefects), in education (the *Université*), and in government (personal dictatorship, disguised by a subservient parliamentary system). Civil equality, and modern forms of contractual property were codified in the body of laws known as the Code Napoléon (q.v.), and a new official elite was created in the Legion of Honor (q.v.). Freedoms won during the French Revolution of 1789, such as freedom of speech, of association, of the press, were abrogated and in their place a system of censorship, government propaganda, and suppression of dissent was instituted. Finally, in order to mitigate the discontent prevailing among many Frenchmen because of previous revolutionary measures against the Catholic Church, Bonaparte negotiated an agreement with Pope Pius VII (*see under* Pius) in 1801. This Concordat (q.v.) substantially restored the Church to an official position in France, but placed it firmly under government control and maintained freedom of religion.

Emperor of the French. Bonaparte also attempted to form a great overseas colonial empire for France. In 1800 he forced Spain to cede Louisiana to France and attempted unsuccessfully to conquer Haiti. When war again broke out between Great Britain and France in 1803, he abandoned the idea of an overseas empire and sold Louisiana to the United States. In 1804 the Third Coalition, comprising Great Britain, Austria, Russia, and Sweden, was formed against Bonaparte. As a first step in meeting this new threat, and in order to stifle the opposition that plotted against him in France, he established a hereditary empire. On Dec. 2, 1804, at a ceremony in Paris, he proclaimed himself Emperor of the French, arrogantly taking the crown from the hands of the pope and placing it on his own head.

Napoleon had for some time been contemplating an invasion of England, but, realizing that such an invasion could not be accomplished with the weak French navy at his disposal, he launched instead a military campaign against Austria in 1805. He defeated the Austrians at Ulm (Oct. 17), captured Vienna, and crushed a combined Russian and Austrian force at the Battle of Austerlitz (Dec. 2). Austria was compelled to sign the Treaty of Pressburg by which she was forced out of the Third Coalition. Napoleon then organized the Confederation of

the Rhine (q.v.), a league of German principalities; these renounced their allegiance to the Holy Roman Empire (q.v.), which thereupon came to an end. Napoleon was then virtually master of the Continent, but Great Britain, by virtue of Nelson's naval victory over the French off Cape Trafalgar (Oct. 21, 1805) continued to control the seas.

At this point Prussia belatedly sought to oppose Napoleon's hegemony on the continent, but was humiliatingly defeated at Jena (Oct. 14, 1806). After briefly occupying Berlin the French turned to face the Russians, and after several indecisive battles and unprecedented carnage, Alexander I (q.v.), Emperor of Russia, decided to reach an agreement with his fellow emperor. In the Treaty of Tilsit, Russia gave up its Polish possessions, which Napoleon added to the Grand Duchy of Warsaw he had formed from Prussian Poland; and Russia also became an ally of France.

Napoleon persisted in consolidating the power of France by placing his relatives on various European thrones. He dethroned the king of Spain and placed his brother Joseph Bonaparte on that throne; made his brothers Louis and Jérôme kings of Holland and of Westphalia, respectively; and established his brother-in-law Joachim Murat (q.v.) as king of Naples and his step-son Eugène de Beauharnais as viceroy of Italy. In addition, Joseph Bonaparte's brother-in-law, Jean Bernadotte, one of Napoleon's principal generals, became crown prince and later Charles XIV John (q.v.), King of Sweden. Napoleon himself sought to make his dynasty stable by allying himself through marriage to one of the old royal houses of Europe. In 1809 he divorced Joséphine, by whom he had had no children, and next year married Marie Louise (1791–1847), daughter of the emperor of Austria, whose armies had been defeated at the Battle of Wagram (July 6, 1809). One son, the so-called Napoleon II (1811–32), was born of the marriage.

Napoleon was then at the zenith of his power, and had apparently established a permanent dynasty. Numerous forces, however, were destined to overthrow him. The Spanish, aided by Great Britain, revolted in 1808. In the resulting Peninsular War, British, Spanish, and Portuguese armies were unable to drive the French out of Spain, but for four years they held down large French forces that Napoleon might have used elsewhere; *see* SPAIN: *History*. Austria and Prussia again prepared to fight Napoleon; Russia, abandoning its alliance with France, and Sweden, despite the connection of Crown

Prince Bernadotte with Napoleon, allied themselves once more with Great Britain. Napoleon decided to crush Russia first. In 1812, after marching through Saxony and Poland, he invaded Russia with about 500,000 men. He defeated the Russians at the Battle of Borodino and took Moscow on Sept. 14, 1812. Shortly thereafter fires, believed to have been started by looters, swept through the city. Napoleon, having no shelter for his army, was forced to retreat across Russia during October and November. Severe cold weather and Russian guerrilla tactics reduced the French force of approximately 500,000 to one of less than 50,000.

Defeat at Leipzig. The Russian adventure cost Napoleon much of his military prestige, and the Fifth Coalition of powers was immediately formed, consisting of Great Britain, Prussia, Austria, Sweden, and Russia. He defeated the coalition at Dresden (Aug. 26–27, 1813), but was himself defeated at the Battle of Leipzig (Oct. 16–19) and forced to retire into France. The armies of the coalition followed him, and despite several brilliant victories, Napoleon, suffering from lack of manpower, was forced to retreat into Paris. The allies attacked the city from three sides (March 30, and Napoleon's marshals, believing that resistance was hopeless, capitulated on the same day. On April 11, 1814, Napoleon signed an unconditional abdication, and went into exile on the island of Elba, where the allies had granted him full sovereignty and promised him financial support.

The Hundred Days. The Bourbon dynasty, in the person of Louis XVIII (q.v.), was restored. Napoleon, however, soon made a dramatic attempt to regain his power. Even while the European powers were assembled at the Congress of Vienna in order to reorganize the Continent after they had at long last defeated the "Corsican Adventurer", Napoleon made a dramatic attempt to regain his power. He left Elba secretly on Feb. 26, 1815. He landed on the French coast on March 1, and, after a triumphal march northward, entered Paris on March 20. The army and the people rallied to him; he quickly organized his forces, and decided to attack the coalition in Belgium. The latter had two principal armies at its disposal, one under Arthur Wellesley, 1st Duke of Wellington (q.v.), in Belgium and another under the Prussian marshal Gebhard von Blücher (q.v.) in the Rhine provinces. Napoleon defeated Blücher at Ligny, June 16, but the combined armies of Wellington and Blücher defeated him finally in the famous Battle of Waterloo, June 18. After his defeat Napoleon fled back to Paris. On June 22 he signed a second abdic-

tion. He then placed himself in the hands of the British, who exiled him in 1815 to the island of Saint Helena in the South Atlantic Ocean. He died there six years later. In 1840 his remains were removed to France and entombed under the dome of the Hôtel des Invalides, Paris.

Napoleon in Historic Perspective. Napoleon has often been considered an autocrat, ruthless in the pursuit of his extraordinary ambition. He was equally impatient with the outmoded institutions of the old regime and with the promise of democracy in the French Revolution. In France he eradicated the vestiges of democracy and offered his countrymen instead a seemingly efficient government. More important, perhaps, he offered them the glory of preeminence in Europe. To achieve this, however, he was drawn into a constantly widening circle of aggression. Each new victory and acquisition seemed to require further actions and aggressions to protect the gains already achieved, regardless of whom it alienated or threatened. Historians generally agree that such behavior was certain to result in defeat. Although Napoleon's military adventures were not primarily directed at extending the principles of the French Revolution to the rest of Europe, they eventually did so. In most areas where Napoleon's armies triumphed, kings were dethroned, feudalism abolished, and modernizing reforms introduced. Historians will always regard Napoleon a fascinating and puzzling exemplar of the individual who influences the course of history.

See **NAPOLÉONIC WARS** and separate articles on many of the treaties and military engagements mentioned in this article. C.J.H.H. & I.W.

NAPOLÉON II. See **NAPOLÉON I: Emperor of the French**.

NAPOLÉON III, known as **LOUIS NAPOLÉON**, full name **CHARLES LOUIS NAPOLÉON BONAPARTE** (1808–73), Emperor of France, nephew of Napoleon I (q.v.), and son of Louis Bonaparte, King of Holland (see under **BONAPARTE**), and Hortense de Beauharnais (1783–1837), born in Paris.

In 1836 he attempted to head a movement among the military at Strasbourg, but was overpowered and conveyed to the United States. He returned to Europe the following year and settled in London. In 1840 he made his second attempt on the throne of France at Boulogne, but was captured. After an imprisonment of more than five years, he escaped on May 25, 1846.

The Revolution of 1848, brought him back to France and he was elected deputy for Paris. In September, he was elected president of the Second French Republic.

NAPOLEONIC CODE

On December 20, he took the oath of allegiance to the republic, but early in 1849 a series of struggles began between the president and his friends on one side and the majority of the assembly on the other. In 1851 he overthrew the constitution by a *coup d'état* and was reelected for ten years. The imperial title was assumed one year later.

His rule was marked by the suppression of the press and by involvement in the Crimean War (q.v.) and the war with Austria, in which Sardinia and France won the battles of Magenta and Solferino and which was terminated by the peace of Villafranca. He established Maximilian (q.v.), Archduke of Austria, on the new imperial throne of Mexico during the American Civil War, despite the protests of the U.S. government. This unstable government, however, collapsed in 1867. Finally, in 1870, the French ministry against the emperor's wishes brought on the Franco-German War (q.v.).

Napoleon was captured at Sedan (see SEDAN, BATTLE OF) and confined at Wilhelmshöhe. In March, 1871, he joined Empress Eugénie (q.v.) at Chiselhurst, England, and resided there till his death.

NAPOLEONIC CODE. See CODE; CODE NAPOLÉON; NAPOLEON I.

NAPOLEONIC WARS, series of wars that took place between France and a number of European nations from 1799 to 1815. In 1799 France came under the domination of Napoléon Bonaparte, then the principal member of the Consulate during the French Revolution (qq.v.), and, later Napoleon I (q.v.), Emperor of France. The Napoleonic Wars were a continuation of the wars of the French Revolution, in which the dynastic rulers of Europe combined in an effort to overthrow the revolutionary government of France and restore the rule of the French monarchy.

First Coalition. In the War of the First Coalition (1793–97), in which France fought against an alliance consisting of Austria, Prussia, Great Britain, Spain, the Netherlands, and Sardinia, Bonaparte was entrusted by the government of France, the Directory (q.v.), with conducting military operations against Austrian forces in northern Italy (1796–97). Subsequently he was made the leader of an expedition (1798–99) to conquer Egypt as a base for future attack against the British possession of India. Although they took place before the Consulate was established, these two campaigns (for details, see NAPOLEON I) are generally regarded as the opening phases of the Napoleonic wars because they were the first in which Bonaparte displayed on a

large scale his genius as a commander; early battles of the War of the Second Coalition (see below) are also included in this category.

Second Coalition. Bonaparte's success against Austria in his northern Italian campaign of 1796–97 had put an end to the First Coalition. During his absence in Egypt, however, a new alliance known as the Second Coalition was formed on Dec. 24, 1798; this alliance comprised Russia, Great Britain, Austria, the Kingdom of Naples, Portugal, and the Ottoman Empire. The principal fighting of the War of the Second Coalition, which broke out at the end of 1798, took place during the following year in northern Italy and in Switzerland. In the former area the Austrians and Russians, under the leadership chiefly of the noted Russian general Count Aleksandr Suvorov (q.v.), were uniformly successful. They defeated the French in the battles of Magnano (April 5), Cassano (April 27), the Trebbia (June 17–19), and Novi (August 15); captured Milan; put an end to the Cisalpine Republic (q.v.), which had been formed under French auspices in 1797; occupied Turin; and in general deprived the French of the fruits of the victories they had won in Italy under Bonaparte. In Switzerland matters went better for the French. After a defeat at Zürich (June 4–7) by Charles Louis John (q.v.), Archduke of Austria, French forces under General André Masséna (1758–1817) defeated (Sept. 26) a Russian army under General Alexander Mikhailov Korsakov. The victorious General Suvorov led his forces from northern Italy across the Alps to join those of Korsakov in Switzerland. He found Korsakov's forces already defeated and scattered; he himself was forced by the French to take refuge in the mountains of the canton of Grisons where, during the early fall, his army was practically destroyed by cold and starvation. On Oct. 22, alleging lack of co-operation by the Austrians, the Russians withdrew from the Second Coalition.

TREATY OF LUNÉVILLE. After he returned to France from Egypt (October, 1799) and became one of the Consulate (November, 1799), Bonaparte offered to make peace with the allies. The Coalition refused, and the French leader planned a series of moves against Austria, and various German states in alliance with Austria for the spring of 1800. He himself crossed the Alps into northern Italy with a newly raised army of 40,000 men, and on June 14 defeated the Austrians in the battle of Marengo. In the meantime French forces under General Jean Victor Moreau (1763–1813) had crossed the Rhine into southern Germany, taken Munich, signally defeated the Austrians under John, Archduke of Austria

(1782–1859) in the battle of Hohenlinden in Bavaria (Dec. 3) and, advancing into Austria, reached the city of Linz. These and other French successes caused Austria to capitulate. By the Treaty of Lunéville (Feb. 9, 1801), Austria and its German allies ceded the left bank of the Rhine River to France, recognized the Batavian, Helvetian, Cisalpine, and Ligurian republics, and made other concessions. The Treaty of Lunéville also marked the breakup of the Second Coalition; the only allied nation which continued fighting was Great Britain, whose troops had unsuccessfully engaged the French on Dutch soil in 1799, and made some territorial gains at the expense of France in Asia and elsewhere. On March 27, 1802, Great Britain itself made peace with France through the Treaty of Amiens.

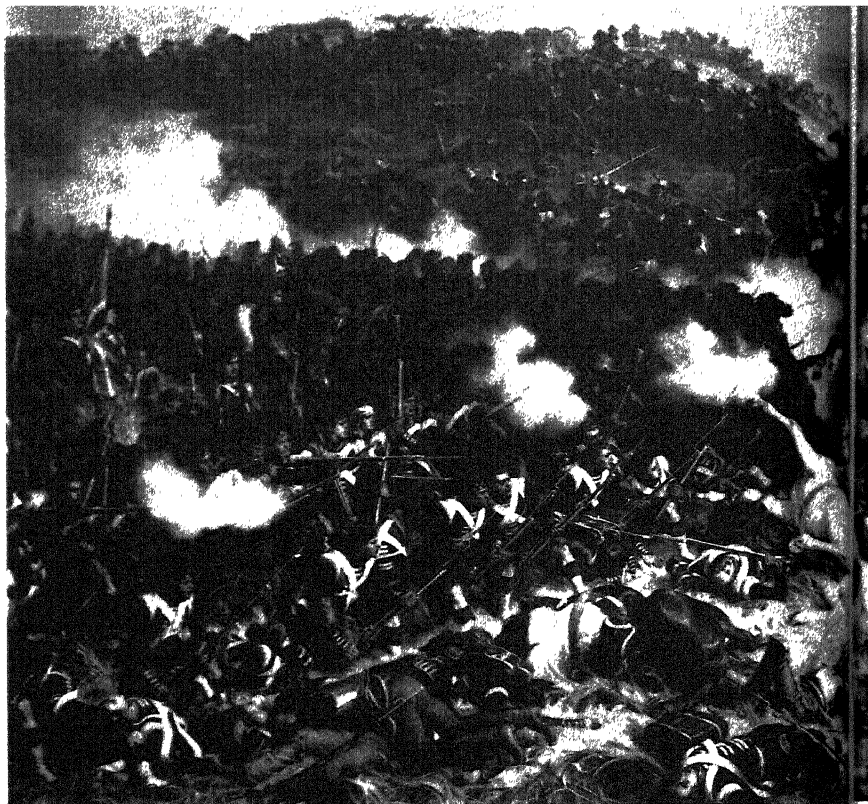
This peace, however, turned out to be a mere truce. In 1803 a dispute broke out between the two nations because of the refusal of France to surrender the island of Malta (taken June 12, 1798, by Bonaparte's forces, while on their way to Egypt) to its original possessors, the Knights of Saint John of Jerusalem (q.v.), as provided in the Treaty of Amiens; and war again broke out between Great Britain and France. An important consequence of this war was Bonaparte's abandonment, because of the need to concentrate his resources in Europe, of his plan to establish a great French colonial empire in the region known as Louisiana in North America, west of the United States. Instead, he sold Louisiana to the U.S.; see LOUISIANA PURCHASE; UNITED STATES OF AMERICA: *History*. In 1805 Great Britain was joined in its new war by Austria, Russia, and Sweden; and Spain allied itself to France; the ensuing war is known as the War of the Third Coalition.

Third Coalition. Bonaparte quickly moved against the new alliance. Since 1798 he had exerted pressure on Great Britain by keeping an army concentrated at Boulogne on the English Channel ostensibly preparing to invade England; and during the dissensions leading to the outbreak of war in 1803, Bonaparte had greatly increased the French forces at Boulogne. After the formation of the Third Coalition against France, he moved his troops from Boulogne to meet the Austrians who, under Ferdinand III, Grand Duke of Austria (1769–1824) and General Karl Mack von Leiberich (1752–1828), had invaded Bavaria. A number of German states, including Bavaria, Württemberg, and Baden, allied themselves with France. Bonaparte defeated the Austrians at Ulm, taking 23,000 prisoners, and then marched his troops along the Danube R. and

captured Vienna. Russian armies under General Mikhail Ilarionovich Kutuzov (1745–1813) and Alexander I (q.v.), Emperor of Russia reinforced the Austrians, but Bonaparte crushed the combined Austro-Russian forces in the Battle of Austerlitz, sometimes known as the Battle of the Three Emperors. Austria again capitulated, signing the Treaty of Pressburg on Dec. 26, 1805. Among the terms of this treaty were the concession by Austria to France of territory in northern Italy, and to Bavaria of territory in Austria itself; in addition, Austria recognized the duchies of Württemberg and Baden as kingdoms.

Confederation of the Rhine. In Italy, where French forces under Masséna had defeated the Austrians under Charles Louis John, Bonaparte now made his elder brother, Joseph Bonaparte (see under BONAPARTE) king of Naples in 1806. Elsewhere in Europe, he made his third brother, Louis Bonaparte, king of Holland (the former Batavian Republic); and on July 12 established the Confederation of the Rhine, which eventually consisted of all the states of Germany excepting Austria, Prussia, Brunswick, and Hesse. The formation of the Confederation put an end to the Holy Roman Empire (q.v.), and brought most of Germany under Napoleon Bonaparte's control. His Continental successes, however, were largely offset by the victory on Oct. 21, 1805, of the British fleet under Admiral Horatio Nelson (q.v.) off Cape Trafalgar over the combined fleets of France and Spain; this victory gave Great Britain mastery of the sea throughout the remainder of the Napoleonic era. In 1806 economic warfare between Great Britain and France was initiated. Napoleon formulated his so-called Continental System (q.v.), issuing decrees, in 1806 and later, forbidding British trade with all European nations; Great Britain retaliated by the Orders in Council, which in effect prohibited neutrals from trading between the ports of any nations obeying Napoleon's decrees. British mastery of the sea made it difficult for Napoleon to enforce the Continental System, and resulted eventually in the failure of his economic policy for Europe.

Fourth Coalition. Before the effect of British sea power could be manifest, however, Napoleon increased his power over the Continent. In 1806 Prussia, aroused by Napoleon's growing strength in Germany, joined in a Fourth Coalition with Great Britain, Russia, and Sweden. Napoleon signally defeated the Prussians in the Battle of Jena on Oct. 14, 1806 and captured Berlin. He then defeated the Russians in the Battle of Friedland and forced Alexander I to make peace. By the principal terms of the Treaty of



"The Battle of Waterloo", a panoramic painting by the 19th-century French artist Henri Emmanuel Félix Philippoteaux.
Victoria and Albert Museum, London

Tilsit, Russia gave up its Polish possessions and became an ally of France, and Prussia was reduced to the status of a third-rate power, deprived of almost half its territory and crippled by heavy indemnity payments and severe restrictions on the size of its standing army. Through military action against Sweden on the part of Russia and Denmark, Gustavus IV (q.v.), King of Sweden, was forced to abdicate in favor of his uncle, Charles XIII (see *under* CHARLES), on the condition that the latter name as his heir General Jean Baptiste Jules Bernadotte, one of Napoleon's marshals. Bernadotte actually became king in 1818, as Charles XIV John (q.v.), founding the present Swedish royal line.

Anti-Napoleonic Nationalism. In 1808 Napoleon was master of all of Europe excepting Russia and Great Britain, but from this time on his power began to decline. The chief reasons for this decline were the rise of a nationalistic spirit in the various defeated nations of Europe;

and the persistent opposition of Great Britain, which, safe from invasion because of its superior navy, never ceased to organize and subsidize new coalitions against Napoleon.

In Spain Napoleon first encountered the nationalistic spirit that led to his downfall. In 1808, after dethroning Charles IV, King of Spain, (see *under* CHARLES), Napoleon made his own brother Joseph Bonaparte, king of that country. The Spanish revolted and drove Joseph out of Madrid. A violent struggle (1808–13) known as the Peninsular War then took place between the French, intent on restoring Joseph as king, and the Spaniards, aided by British forces under Arthur Wellesley, 1st Duke of Wellington (q.v.). The Allies eventually defeated the French, inflicting losses in manpower that severely handicapped Napoleon when he was later forced to meet new enemies in the east and north of Europe. The first of these new enemies was Austria, which, inflamed by patriotic feeling, entered the Fifth Coalition, with Great Britain in 1809. Napoleon defeated the Austrians at Wagram (July, 1809), and inflicted upon them the



Treaty of Vienna, by which Austria lost Salzburg, part of Galicia, and a large part of its southern European territory. He also divorced his first wife and married the daughter of Francis II (q.v.), Holy Roman Emperor, in the vain hope of keeping Austria out of further coalitions against him.

Defeat of Napoleon. The turning point of Napoleon's career came in 1812 when war again broke out between France and Russia because of Alexander's refusal to enforce the Continental System. With one large army already tied down by the so-called "Spanish ulcer", Napoleon invaded Russia with an army of 500,000. He defeated the Russians at Borodino and took Moscow (Sept. 14, 1812). The Russians burned the city, making it impossible for Napoleon's troops to establish winter quarters there. The French retreated across Russia into Germany, suffering the loss of most of their men through cold, starvation, and Russian guerrilla attacks. Russia then joined the Fifth Coalition, which also included Prussia, Great Britain, and Sweden. In 1813, in a burst of patriotic fervor caused

by the political and economic reforms that had taken place in the nation since its defeat at Jena, Prussia opened a War of Liberation against Napoleon. He defeated the Prussians at Lutzen and Bautzen and achieved his last important victory at the Battle of Dresden where, on Aug. 27, 1813, a French force of about 100,000 defeated a combined Austrian, Prussian, and Russian force of about 150,000. The following October, however, Napoleon was forced by the Battle of Leipzig to retreat across the Rhine, thus freeing Germany. The following year the Russians, Austrians, and Prussians invaded France from the north; in March, 1814, they took Paris, whereupon Napoleon abdicated and was sent into exile on the island of Elba in the Mediterranean Sea.

The Allies then called the Congress of Vienna to restore in Europe the monarchies Napoleon had overthrown. During their deliberations Napoleon escaped from Elba to France, quickly raised an army, and marched into Belgium to meet the forces of Great Britain, Prussia, Russia, and Austria. He defeated his enemies at Ligny, was defeated by them at Quatre-Bras, and met

final defeat (June 18, 1815) at the Battle of Waterloo, which marked the end of the Napoleonic Wars.

Conclusion. Initially the Napoleonic Wars perpetuated the ideological conflict between revolutionary France and monarchical Europe. At some point, however, the elusive ambitions of Napoleon himself became their principal and consistent cause. The wars, moreover, bore Napoleon's personal stamp because he determined strategy and commanded the French armies. His ever-broadening diplomatic ambitions were matched by his military strategy, a bold style of taking calculated risks. This style in turn reflected the strength of the French army, whose tactics, organization, equipment, and morale had all improved during the Revolution, and which was led by talented field generals who had risen from the ranks. Napoleon's genius as commander was his ability to move his men very rapidly, thus gaining an important element of surprise over his opponents. His major failings were matters of attitude rather than technique. In general he underestimated his enemies, perhaps because of his early, one-sided victories. In Spain and Russia he was further hampered by his insensitivity to national spirit and by his belief that seizure of a capital city such as Madrid or Moscow would lead his opponent to capitulate. Most important in its impact on the nature and frequency of these wars was Napoleon's utter disregard for the cost of his campaigns in bloodshed and lives.

See separate articles on many of the treaties and military engagements mentioned in this article.

C.J.H.H. & I.W.

NARA, city in Japan, and capital of Nara Prefecture, on S.E. Honshu Island, about 20 miles E. of Osaka. The principal manufactures are India ink, fans, and toys. In Nara Park is one of the largest bronze statues in the world, a 53.5-ft. statue of Buddha (q.v.). Also in Nara are the temples of Kasuga and Todai-ji. From 710 to 784 A.D., Nara was the first permanent capital of Japan. Pop. (1970) 208,266.

NARAYANGANJ, city and port of Bangladesh, situated on the Sitalakhya R. at its confluence with the Dhaleswari R., 8 miles S.E. of Dacca. A road center and rail terminus, the city serves as the river port of Dacca. An industrial city specializing in jute and cotton milling, Narayanganj also engages in rice and sugar milling, tanning, shipbuilding, engineering, iron-working, and the manufacture of leather, glass, chemicals, hosiery, paper products, and matches. It trades in jute, rice, fish, and oilseeds. A noted 16th-century mosque is here; and across the Dhaleswari

R. is the Idrakpur Fort built in 1660. Pop. (1971 est.) 389,000.

NARBADA. See NARMADA.

NARBONNE, city of France, in Aude Department, near the Gulf of Lions, 37 miles E. of Carcassonne. Wine and honey come from the surrounding region and tile and pottery are manufactured in the city. Noteworthy buildings are the Cathedral of Saint Just (1272-1332), and the archbishops' palace (13th-14th cent.) which now houses important art and historic collections. Narbonne was the *Narbo Martius* of the Romans, their first colony (118 B.C.) beyond the Alps. The city was a leading port until the 13th century when its harbor silted up. Pop. (1971) 40,035.

NARCISSUS, genus of bulbous herbs belonging to the Amaryllis family, Amaryllidaceae. The genus is native to the warmer portions of the Old World and is widely cultivated in gardens. Members of the genus have long, sometimes rushlike leaves growing upward from the bulbous root. The flowers, one or two of which are usually borne on each plant, have six petallike sepals, a corolla of six united petals, six stamens, and a solitary pistil. A cup-shaped crown, called the corona, arises from the inner surface of the corolla. The flowers are usually white or yellow or some combination of these two shades. The fruit is a many-seeded capsule.

Plants in the genus *Narcissus* are among the first to bloom, their large flowers appearing in early spring. The plants are best cultivated outdoors in moist soil in temperate regions; the most favorable planting time is in September, so that the roots can grow and establish the plant before the onset of cold weather. Several varieties can be raised indoors; these varieties are planted in a bowl of water, often with pebbles or small shells. They are kept in a cool, dark

Jonquil, Narcissus jonquilla

Bermuda News Bureau



place for several weeks until the roots are established and then placed in a sunny window.

A common species in the genus *Narcissus* is the yellow daffodil, *N. pseudonarcissus*, which is characterized by a deep, trumpet-shaped crown. The jonquil, *N. jonquilla*, has yellow flowers with short crowns. The poet's narcissus, or pheasant's eye, *N. poeticus*, has pure white petals and a shallow, wrinkled, reddish crown. The polyanthus, *N. tazetta*, has small, white or yellow flowers, borne in umbels and having short coronas. Ganymede's cup, *N. triandrus*, has long, drooping, white flowers. Butter-and-eggs, *N. incomparabilis*, has large flowers tinted in two shades of yellow. Many hybrids of these species have been developed; their flowers may be single or double, white, yellow, pink, cream-colored, orange, or orange-red; the corona and corolla may be differently colored, and the corona itself may be of more than one hue.

Narcissus bulbs contain unknown active principles which may, if eaten, produce in both man and animals symptoms of severe digestive upset including vomiting and diarrhea, accompanied by trembling and convulsions.

NARCISSUS, in Greek mythology, a handsome youth, the son of the river-god Cephissus. Because of his great beauty many women fell in love with Narcissus, but he repulsed their advances. Among the lovelorn maidens whom Narcissus scorned was the nymph Echo, who had incurred the displeasure of Hera, the jealous wife of the god Zeus (q.v.), and had been condemned by the goddess never to speak again except to repeat what was said to her. Echo was therefore unable to tell Narcissus of her love, but one day, as Narcissus was walking in the woods, he became separated from his companions. When he shouted, "Is anyone here?", Echo joyfully answered, "Here, here". Unable to see her hidden among the trees, Narcissus cried "Come!" Back came the answer, "Come, come", as Echo stepped forth from the woods with outstretched arms. Narcissus cruelly refused to accept Echo's love; she was so humiliated that she hid in a cave and wasted away until nothing was left of her but her voice. To punish Narcissus, the avenging goddess Nemesis (q.v.) made Narcissus fall hopelessly in love with his own beautiful face as he saw it reflected in a pool. As he gazed in fascination, unable to remove himself from his image, he gradually pined away. At the place where his body had lain grew a beautiful flower, honoring the name and memory of Narcissus.

NARCOTICS, term originally applied to all compounds that produce insensibility to exter-

nal stimuli through depression of the central nervous system, but now more narrowly used. It is now applied chiefly to the drugs known as opiates—compounds extracted from the opium poppy and their chemical derivatives. Also classed as narcotics are the opioids, compounds that are wholly synthesized but which resemble the opiates in their actions.

The most important attribute of narcotics is their capacity to decrease pain, not only by decreasing the perception of pain but also by altering the individual reaction to it. Although they do have sedative properties when used in large doses, this is not their major action and they are not used primarily for sedation. Secondary uses of narcotics are as cough-suppressants and in treatment of diarrhea.

The major constituent of opium (q.v.) and the prototype of all narcotic analgesics is morphine (q.v.), which was first isolated and chemically analyzed by the German apothecary F. W. A. Setürner between 1805 and 1817. All narcotics resemble morphine pharmacologically, possessing most of its properties and characteristics to varying degrees. In addition to morphine, other narcotics used in the United States are meperidine (trade name Demerol), codeine, and propoxyphene (Darvon). Heroin (q.v.), synthesized from morphine, is a potent analgesic but its use is forbidden in the U.S. Some of the newer synthetic compounds are a thousand to ten thousand times more potent than morphine.

In addition to their pain-killing properties, the narcotic analgesics cause a profound feeling of well-being (euphoria). It is this feeling that is in part responsible for the psychological drive of certain individuals to obtain and self-administer these drugs. When taken chronically in large doses, the narcotics have the capacity to induce tolerance (whereby a larger and larger dose is required by the body to achieve the same effect), and ultimately psychological and physical dependence. In this respect they are similar to the barbiturates and to alcohol. These properties make the medical use of narcotics extremely difficult and have led to strict regulation of the prescription and dispensing of this class of drugs. Even so, they are widely abused.

The mode of action of the narcotic analgesics is still not fully understood. There is controversy as to where the pain centers are in the brain and just how the narcotic analgesics act on these centers. Most authorities agree that these drugs do not act by blocking the transmission of nerve impulses from the rest of the body to the brain, but rather by altering such messages when they are received in the brain itself.

NARCOTICS AND DANGEROUS DRUGS, BUREAU OF

Recent research has determined that specific regions of the brain have an affinity for binding opiates, and these binding sites are in the same general areas where the pain centers are believed to be. This research has also succeeded in isolating a compound, enkephalin, consisting of five amino acids, which is believed to be an opiate-like material released in the brain itself. Other investigators have described a larger compound that may be a fragment of the pituitary hormone β -lipotropin. This substance, endorphin, may be released at the opiate receptor sites and may be responsible for the initiation of analgesia. Administration of both enkephalin and endorphin to animals results in effects similar to those produced by opiates.

The discovery of a class of compounds that are specific antagonists to the action of the opiates has made it possible to treat opiate overdosage quickly and efficiently. The antagonists can also be used in the treatment of narcotic addiction by making it impossible for the addict to feel any effects from taking the drugs.

The fact that some of the antagonists also have opiate-like properties has led to the introduction of a new class of analgesics, the mixed agonists-antagonists. It is hoped that these drugs will produce analgesia without the side effects of the opiates themselves. Pentazocine (Talwin), the first of such drugs marketed, is effective in the treatment of pain and does not induce euphoria. Whether the mixed agonist-antagonist analgesics will be useful depends on whether the euphoria produced by analgesics of the morphine type is or is not an intrinsic factor in the moderation of pain. J.CN.

NARCOTICS AND DANGEROUS DRUGS, BUREAU OF. See DRUG ENFORCEMENT ADMINISTRATION.

NARD. See SPIKENARD.

NARMADA, formerly NARBADA, river of India, rising in N. Madhya Pradesh State. It flows between the Vindhya and Satpura ranges in a generally s.w. direction for about 800 mi., emptying into the Gulf of Cambay, an arm of the Arabian Sea. The Narmada is regarded by Hindus as one of the holiest rivers of India.

NARRAGANSETT, tribe of North American Indians of Algonquian (q.v.) stock, originally occupying most of the territory along the western shore of Narragansett Bay, in Rhode Island, and claiming dominion over several smaller tribes of the interior and the neighboring islands, including Long Island, N.Y. They were one of the largest and strongest of the New England tribes. Their economy was based on corn as a staple food, fishing, and hunting. They were expert in

canoeing and swimming. Tobacco was grown for smoking and was also used medicinally. They lived by the sea in summer and inland in winter, building wigwams of skins, mats, or bark, supported on poles. In the latter part of the 17th century, the Narraganset took part in Indian warfare against the English colonists. They were decimated due to warfare and smallpox, never regaining their former strength. A number merged with other tribes; the rest intermarried with European settlers.

NARRAGANSETT BAY, inlet of the Atlantic Ocean, extending deep into Rhode Island. It is about 26 mi. long, and between 3 and 12 mi. wide. It receives several small rivers, including the Taunton, the Blackstone, and the Pawtuxet, and contains a number of islands of which Rhode, Prudence, and Conanicut are the largest. At the head of the bay is the city of Providence (q.v.), the State capital.

NARROWS, THE, short strait that connects the upper and lower bays of New York Bay (q.v.), and separates Brooklyn from Staten Island. It is about 1 mi. wide and 2 mi. long. Fort Hamilton and Fort Wadsworth overlook the strait. In 1964, it was spanned by the Verrazano-Narrows Bridge, the longest suspension bridge in the world; see BRIDGE: *Suspension Bridge*. The strait is within the Gateway National Recreation Area, authorized in 1972.

NARSES. See BELISARIUS; BYZANTINE EMPIRE: *History*.

NARTHEX. See BASILICA.

NARVÁEZ, Pánfilo de. See CORTES, HERNANDO.

NARWHAL, or SEA UNICORN, common name applied to a toothed whale, *Monodon monoceros*, of the family Monodontidae, found in northern seas. All the narwhal's teeth except the upper incisors degenerate early in life; the upper left incisor in the adult male, and sometimes the female, develops into a tusk, 7 to 9 ft. in length. The animal attains a body length of almost 20 ft. It is hunted for its tusks, used by man as ivory, and for its oil.

NASBY, Petroleum V. pen name of the American journalist David Ross Locke (q.v.).

NASH, Ogden (1902-71), American humorist, born in Rye, N.Y., and educated at Harvard University. He is noted for his comic verse, which in tone ranges from gay to bitter, and which at times is completely and hilariously nonsensical; it is characterized by startling rhymes and puns, asymmetric lines, and highly amusing parenthetical statements that often appear to be introduced to give the opportunity for a surprising rhyme. Among his collections of verse are *Free Wheeling* (1931), *Hard Lines* (1931), *Happy Days*

(1933), *The Bad Parent's Garden of Verse* (1936), *I'm a Stranger Here Myself* (1938), *Good Intentions* (1942), *Versus* (1949), *Family Reunion* (1950), *Parents Keep Out* (1951), *The Moon Is Shining Bright As Day* (1953), *The Private Dining Room* (1953), *You Can't Get There from Here* (1957), *Everyone But Thee and Me* (1962), *Marriage Lines* (1964), *Cruise of the Aardvark* (1967), and *There's Always Another Windmill* (1968). With the American humorist S. J. Perelman (1904–) Nash wrote the musical comedy *One Touch of Venus* (1943); he is also author of the lyrics for the revue *Two's Company* (1952). **NASH, Thomas** or **NASHE, Thomas** (1567–1601), English novelist, pamphleteer, and dramatist, born in Lowestoft, and educated at the University of Cambridge. About 1588, after traveling on the Continent, he took up residence in London to follow a literary career. He was one of the writers employed by the Church of England (q.v.) to answer the satiric attacks made on it by a Puritan writer known as Martin Marprelate; under the pen name of "Pasquil" Nash wrote a number of satiric pamphlets in the Martin Marprelate controversy, including *An Almond for a Parrat* (1590). He also took part in a violent literary controversy against the poet Gabriel Harvey (about 1545–1630) and his brother Richard Harvey (1560–1623?), who had been extremely critical of the writings of Nash and his friend Robert Greene (q.v.). Nash's prose satire *Pierce Penilesse, His Supplication to the Divell* (1592) is in part an attack on the Harveys, and also on Nash's opponents in the Marprelate controversy; it also protests against the public's neglect of worthy writers. The pamphlet *Have With You to Saffron Walden* (1596) is a further attack against the Harveys. Important among Nash's other writings are the pamphlet *Christs Teares over Jerusalem* (1593), in which he gives a satiric account of the vices of the London of his time; and the satiric masque *Summers Last Will and Testament* (1600). In 1596 Nash completed the blank-verse drama *The Tragedy of*

Dido Queen of Carthage, which his friend the English dramatist Christopher Marlowe (q.v.) had left unfinished at his death. Nash's picaresque novel *The Unfortunate Traveller*, or *The Life of Jack Wilton* (1594) had strong influence on English literature. The work is the earliest novel of adventure in English and the forerunner of the realistic adventure novels of the English writers Daniel Defoe and Tobias Smollett (qq.v.). See **PICARESQUE NOVEL**.

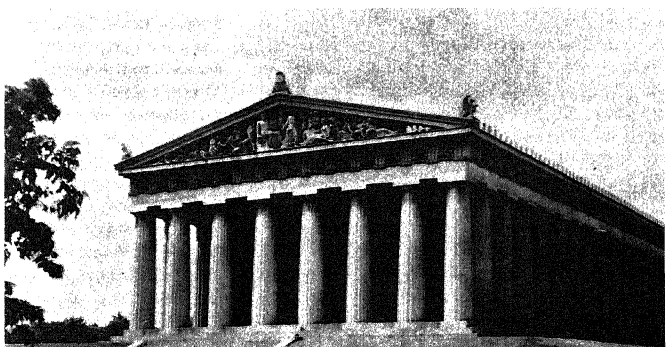
NASHUA, city in New Hampshire, county seat of Hillsborough Co., at the junction of the Merrimac and Nashua rivers, about 15 miles s. of Manchester. The city manufactures paper and wood products, textiles, and shoes. Settled about 1656, it was chartered as Dunstable in 1673, renamed Nashua in 1836, and incorporated as a city in 1853. Pop. (1960) 39,096; (1970) 55,820.

NASHVILLE, capital, city, and port of entry of Tennessee, and county seat of Davidson Co., on the Cumberland R., about 235 miles n.e. of Memphis. Transportation facilities in the city include railroads, river steamers, and a municipal airport. In the State, Nashville is second in population only to Memphis. The city is the educational, commercial, and manufacturing center for the surrounding fertile agricultural area. Among the industrial establishments in the city are plants processing agricultural products and manufacturing shoes, paper goods, electrical appliances, barges, boats, glassware, and nylon, dacron, and cellophane goods. Religious publications are also printed in the city. A branch of the Federal Reserve Bank is in Nashville.

Contributing to the importance of Nashville as an educational center are eleven colleges and universities including Vanderbilt University (q.v.), George Peabody College for Teachers (1875), Tennessee Agricultural and Industrial State University (1912), Meharry Medical College (1865), Fisk University (q.v.), Belmont College (1913), and David Lipscomb College (1891). The most notable building is the State capitol,

The Parthenon, a modern replica of the Greek temple erected in Nashville in 1897 for a Tennessee centennial celebration.

Nashville Area
Chamber of Commerce



NASHVILLE, BATTLE OF

of Greek design, completed in 1859, on the grounds of which is the tomb of President James K. Polk (q.v.). A full-sized replica of the famous Parthenon in Athens, Greece, stands in Centennial Park and contains a collection of art including casts of the Elgin Marbles (q.v.). "The Hermitage", the home of President Andrew Jackson (q.v.), is 12 miles e. of the city. In the garden of the mansion are the tombs of Jackson and his wife.

History. The city was settled in 1779 as Fort Nashborough by colonists from E. Tennessee under the leadership of the American frontiersman James Robertson (1724-1814). The settlement was renamed Nashville and incorporated as a town in 1784. It was chartered as a city in 1806 and was made the State capital in 1843. As the northern terminus of the Natchez Trace (q.v.), a historic road, the city developed as a trading center. The city was the site of the Nashville Convention in 1850, called by the Southern States to discuss the Compromise Measures of 1850 (q.v.). During the American Civil War, Nashville was the scene of an important military engagement; see NASHVILLE, BATTLE OF. Pop. (1960) 170,874; (1970) 447,877.

NASHVILLE, BATTLE OF, battle of the Civil War (see CIVIL WAR, THE AMERICAN) fought south of Nashville, Tenn., Dec. 15 and 16, 1864. After the Battle of Franklin (q.v.), the Confederate general John Bell Hood (q.v.) besieged the Union general George Henry Thomas (q.v.) in Nashville. The latter bided his time in spite of the threat of the forces of the Union General Ulysses Simpson Grant and the enemy's devastations in Tennessee. At length, on Dec. 15, Thomas determined to attack Hood, who had placed troops under Alexander Peter Stewart (1821-1908) on his right, under Stephen Dill Lee (1833-1908) in his center, and under Benjamin Franklin Cheatham (1820-86) on his left. Hood had 44,000 men. Thomas placed General Andrew Jackson Smith (1815-97) on his right, the 4th Corps in the center, and John McAllister Schofield (q.v.) on his left. The battle began by Smith and Schofield crushing the left flank of the Confederate forces and capturing the field-works of the main lines and reserve. During the night Cheatham was moved back to support the left wing. Thomas sent Union General James Harrison Wilson (1837-1925) to work round this line. When a general advance was made at 4 P.M., Smith's onset, concentrated on Hood's left, drove the enemy from the field. Union General Thomas John Wood (1823-1906) also advanced and the rout became complete. The Union losses amounted to 3000 men; the Confederate

losses were never officially published, but the Union troops took 4500 prisoners and 53 guns. **NASIK**, city of the Republic of India, in Maharashtra State, on the Godavari R., 95 miles N.E. of Bombay. It is one of the most sacred places of Hinduism (q.v.). Manufactures include paper, cotton, and brass and copper work. Pop. (1971) 176,187.

NASSAU, former German duchy, later part of the Prussian province of Hesse-Nassau and now largely in the State of Hesse, West Germany. The family of Nassau, the elder branch of which reigned over Nassau until 1866, dates from the 10th century. In 1544, William I (q.v.), of the younger branch, inherited the French principality of Orange, and later became the first stadholder of the Netherlands.

NASSAU, capital, largest city, and chief port of the Bahama Islands, on the N. shore of New Providence Island. The city is the commercial center of the islands and a major tourist resort. It is served by cruise ships and international airlines. The places of interest include several historic forts and a public market. The city was founded in the early 17th century and later became a pirate base. During the American Revolution Nassau was briefly held by American naval forces and during the American Civil War it served as a supply base for Confederate blockade runners. Pop. (1970) 3233.

NASSER, Gamal Abdel (1918-70), Egyptian soldier and statesman, born in Beni Mor, Asyût Province, and educated at the Royal Military Academy, Cairo. He was commissioned an officer of the Egyptian army in 1938 and appointed to the staff of the Royal Military Academy in 1942. In the latter year he founded the Free Officers' Movement, a secret revolutionary organization of discontented young officers, who were destined to play an important role in his military coup some four years later.

Nasser participated with distinction in the 1948-49 war against Israel. Soon after the war he and his fellow conspirators of the Free Officers' Movement began to develop plans for the seizure of power. The organization staged a successful coup d'état in July, 1952, and General Mohammed Naguib (q.v.) was chosen premier. Though Nasser, then a lieutenant colonel, held no official position in the new government, as leader of the Revolution Command Council of the Free Officers' Movement he dominated the regime from its inception. In June, 1953, when Egypt became a republic, Nasser was appointed deputy premier and minister of the interior in Naguib's cabinet. In the subsequent struggle for power between Naguib and Nasser, the latter



emerged victorious; he assumed the premiership in April, 1954. On June 23, 1956, he was elected to the newly created post of president of Egypt, and in 1958, president of the newly formed United Arab Republic (U.A.R.). In 1965 he was reelected president. Following the defeat of the U.A.R. in the June, 1967, Arab-Israeli war, Nasser offered to resign the presidency. Demonstrations in his favor, however, confirmed his position and he continued as president until his death.

Favoring a close alignment with the Soviet Union, Nasser was given the Order of Lenin in 1964. He is the author of *The Philosophy of Revolution* (1954), a pamphlet describing his struggle for power and defining his goals. The publication in 1972 of *The Cairo Documents*, his collected writings on world leaders, was announced in October, 1971. See also EGYPT: *History*; UNITED ARAB REPUBLIC: *History*.

NAST, Thomas (1840-1902), American cartoonist and caricaturist, born in Landau, Germany, and educated at the National Academy of Design, New York City. In 1855 he became a draughtsman for *Frank Leslie's Illustrated Newspaper*, and three years later for *Harper's Weekly*. In 1861 the *Illustrated London News* sent him to Italy to sketch the activities of the Italian nationalist Giuseppe Garibaldi (q.v.). He returned to the United States in 1862, rejoining *Harper's Weekly* as staff cartoonist. His drawings during the Civil War and Reconstruction periods won him fame, but his best-known works are the powerful cartoons attacking the Tammany Ring, or the Tweed Ring (see TWEED, WILLIAM MARCY) of New York City during the years 1869 to 1872.

President Gamal Abdel Nasser with Soviet officials before a wreath-laying ceremony in Moscow in 1968.

UPI

These cartoons introduced the now famous political symbols of the tiger for Tammany Hall (see TAMMANY SOCIETY), the donkey for the Democratic Party, and the elephant for the Republi-

"Mark Twain Securing English Copyright" by Thomas Nast.



NASTURTIIUM

can Party (qq.v.). The cartoons contributed greatly to the downfall of the Tweed Ring. In 1887 Nast left *Harper's Weekly* and in 1894 became a staff member of the *Pall Mall Gazette*, London. In 1902 he was appointed United States consul at Guayaquil, Ecuador, where he died of yellow fever. Nast also illustrated books and painted in oils.

NASTURTIIUM, common name for climbing plants in the genus *Tropaeolum*, native to South America, and widely grown in flower beds and garden borders. The common garden nasturtium, which was derived from *T. majus*, has showy, long-spurred flowers usually orange or red in color. The round leaves and succulent stems have often been used as salad greens. The term nasturtium is applied also as the scientific name of an unrelated genus, which contains the water cress (q.v.).

NATAL, province of the Republic of South Africa, bounded on the n.w. by the Orange Free State Province, on the n. by the Transvaal Province, on the n.e. by Swaziland and Mozambique, on the e. by the Indian Ocean, on the s. by Transkei Province, and on the s.w. by Lesotho. The capital is Pietermaritzburg and the largest city is Durban (qq.v.), a port on the s.e. coast. The Drakensberg (q.v.), the main mountain range of the country, rises sharply from a coastal plain, but gradually falls away into the plains of the interior. The coastal region, extending inland about 30 mi., is fertile. The climate is subtropical. Sugar cane and corn are grown and coal, gold, and copper are mined. A whaling fleet operates from Durban. The University of Natal was founded at Pietermaritzburg in 1909. The province also operates universities for Indian, Sotho, Swazi, Tsongo, Venda, and Zulu students.

History. Natal was discovered in 1497 by the Portuguese navigator Vasco da Gama (q.v.). Settlement was begun in 1824 when the British established a trading post at Port Natal (now Durban). Soon thereafter, fighting erupted with the native tribes, the Zulus (q.v.). The Zulus were finally defeated by Dutch settlers, the Boers (q.v.), who then controlled Natal from 1837 to 1843. Natal became a British colony in 1843, and in 1844 it was annexed to Cape Colony; see CAPE OF GOOD HOPE. PROVINCE of the Natal was reestablished as a separate colony in 1856. A Zulu war in 1879 ended with a British victory; see ZULULAND. Natal gained limited self-government in 1893. Four years later Zululand was annexed by the colony. Natal was invaded by the Boers in 1899 at the outbreak of the South African War (q.v.). They were driven out by the British in 1900. Ten years later, Natal became one of the

original provinces of the Union of South Africa. The provincial status was retained when the Republic of South Africa was established in 1961. Area, 33,578 sq.mi.; pop. (1970) 2,140,166.

NATAL, city and seaport in Brazil, and capital of Rio Grande do Norte Province, on the Potengi R., about 160 miles n. of Recife. The port is used mainly for coastal shipping. Cotton, hides, and sugar are the chief exports. The local industries manufacture cotton goods and refine sugar. Natal was founded in the late 16th century. Pop. (1970) 256,223.

NATCHEZ, city in Mississippi, and county seat of Adams Co., on the E. bank of the Mississippi R., about 85 miles s.w. of Jackson. Built on a high bluff, Natchez is the shipping and manufacturing center of a large cotton and livestock region. The principal manufactures are tires, and paper and lumber products. The French built Fort Rosalie on the site of the city in 1716. Natchez was the capital of the Mississippi Territory from 1798 to 1802, and the first State capital of Mississippi from 1817 to 1821. The strategic location on the river and at the s. end of the Natchez Trace (q.v.), made the city prosperous in the early 19th century. Natchez was incorporated in 1803. Pop. (1960) 23,791; (1970) 19,704.

NATCHEZ TRACE, in United States history, road extending between Nashville, Tenn., and Natchez, Miss. It was made possible by treaties in 1801 between the U.S. and the Chickasaw and Choctaw (qq.v.) tribes. Construction of the road began in 1806. The total distance from Natchez to Nashville was 501 miles. Granite markers identify the site of the old highway. The Natchez Trace National Parkway, under construction, roughly follows the old route. In 1961 the former Ackia Battleground National Monument in Mississippi, commemorating a Chickasaw victory over the French, and Meriwether Lewis National Monument in Tennessee, honoring the leader of the Lewis and Clark Expedition (q.v.), were added to the national parkway. The parkway, covering 45,297.51 acres, was established in 1938. It is administered by the National Park Service (q.v.).

NATCHITOCHES, city in Louisiana, and parish seat of Natchitoches Parish, on the Cane R., about 49 miles n.w. of Alexandria. The city has light manufacturing; cotton is produced, processed, and shipped. It is the site of Northwestern State College of Louisiana, founded in 1884. Founded about 1714 and incorporated in 1819, the city is the oldest in Louisiana. Pop. (1960) 13,924; (1970) 15,974.

NATHAN, George Jean (1882–1958), American editor and critic, born in Fort Wayne, Ind.

He wrote dramatic criticism for several journals and, with H. L. Mencken (q.v.), was founder and editor of the *American Mercury* (1924–25). Nathan was editor of the annual *Theatre Book of the Year* from 1943 to 1951. He is known for his hypercritical prose. His works include *The New American Credo* (1927), *The Morning after the First Night* (1938), *Encyclopedia of the Theatre* (1940), and *Theatre in the Fifties* (1953).

NATHAN, Robert (1894–), American novelist and poet, born in New York City, and educated at Harvard University. His writings are characterized by refinement of feeling, fantasy and whimsicality touched by satire, and delicate, clear, and smooth style. Among his collections of poems are *Youth Grows Old* (1922) and *The Darkening Meadows* (1944). His novels include *Peter Kindred* (1919), *The Puppet Master* (1923), *There Is Another Heaven* (1929), *One More Spring* (1933), *Portrait of Jennie* (1940), *Journal for Josephine* (1943), *But Gently Day* (1943), *Innocent Eve* (1951), *Train in the Meadow* (1953), *The Wilderness-Stone* (1961), *Stonecliff* (1967), *Mia* (1970), and *The Summer Meadows* (1973). He wrote the plays *The Sleeping Beauty* (1950) and *Jezebel's Husband* (1951).

NATICK, town of Massachusetts, in Middlesex Co., about 15 miles S.E. of Boston. It manufactures shoes and clothing. It was founded in 1651 by the American clergyman John Eliot (q.v.) as a "praying Indian" community for Christian members of the Massachuset (q.v.) tribe. White settlement began in 1718, and by the end of the 18th century, intermarriage and disease had severely reduced the Indian population. Natick was incorporated in 1781. Pop. (1970) 31,057.

NATION, Carry Amelia Moore (1846–1911), American temperance leader (see TEMPERANCE), born in Garrard County, Ky. She was raised and educated in various parts of Kentucky, Missouri, and Texas. At the age of twenty-one she married a physician, Dr. Charles Gloyd, who died of alcoholism in 1868(?). She subsequently taught school and, in 1877, married David Nation (b. 1827), a minister-lawyer. The couple settled in Medicine Lodge, Kans., where she responded to what she considered a divine calling to destroy saloons. After three years of delivering lectures and public prayers on the subject, she began, in Wichita, Kans., to use a hatchet to ruin saloons, describing her havoc-wreaking calls as hatchetations. Personally continuing her crusade in many American cities, she was arrested thirty times for disturbing the peace. The proceeds from her lectures and her sales of souvenir hatchets paid for her bail and fines, and also enabled her to found a home, in Kansas City,

Kans., for wives of alcoholics. Her autobiography, *The Use and Need of the Life of Carry Nation*, appeared in 1904.

NATIONAL ACADEMY OF ENGINEERING. See ENGINEERING: *Modern Engineering Trends*.

NATIONAL ACADEMY OF SCIENCES, body of scientists incorporated by an act of the United States Congress in 1863 for the purpose of investigating and reporting upon scientific subjects at the request of any Federal department. The act of incorporation specifies that the academy receive no compensation for services to the government. Membership consists chiefly of U.S. scientists and engineers who are elected on the basis of distinguished contributions to knowledge, up to a limit of fifty at each annual meeting; ten foreign associates may also be elected annually. In 1916 the National Research Council (q.v.) was organized by the academy. Headquarters of the academy are located in Washington, D.C.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, commonly referred to as NASA, agency of the United States government, established by the National Aeronautics and Space Act of 1958. The functions of the organization are to plan, direct, and conduct all U.S. aeronautical and space activities, except those that are primarily military. The administrator of NASA is appointed from civilian life by the President with the advice and consent of the United States Senate. Among other things, the administration arranges for participation by the scientific community in planning scientific measurements and observations to be made through use of aeronautical and space vehicles and provides for wide dissemination of information concerning the results of its activities. Under the foreign-policy guidance of the President, the administration participates in the development of a program of international cooperation in aeronautical and space activities and in the peaceful applications of the results of such activities; see, for example, GEOPHYSICS: *International Geophysical Year*. See also AEROSPACE MEDICINE; ASTRONAUT; ASTRONAUTICS.

NATIONAL ANTHEMS, official national songs honoring the spirit of the native land. For a list of national anthems, with information on their origins, provided by the appropriate consulates, see the following pages. The date of adoption indicates the year in which a country officially adopted its national anthem.

AFGHANISTAN. *Loya Salami* ("Grand Salute"). Music by a group of composers, 1919. Adopted, 1919.

ALBANIA. *Hymni i Flamurit* ("Hymn to the

NATIONAL ANTHEMS

Flag: First line, *Rreth flamurit te per bashkuar* ("The flag which in battle unites us"). Music by Ciprian Porumbescu. Words by A. S. Drenova. Adopted, 1912.

ALGERIA. *Kassamen* ("We Swear"). Music by Muhammad Fawzi, 1956. Words by Moufidi Zakaria, 1955. Adopted, 1963.

ANDORRA. *Himne Andorra*. First line, *El gran Carlemany mon pare* ("Great Charlemagne my Father"). Music by Father Enric Marfany. Words by D. Joan Benlloch i. Vivo.

ARGENTINA. *Himno Nacional*. First line, *Oid, mortales, el grito sagrado* ("Hear, oh mortals, the sacred cry"). Music by José Blas Parera, 1813. Words by Vincente López y Planes, 1813. Adopted, 1813.

AUSTRALIA. *God Save the Queen* (same as Great Britain). National song: *Advance Australia Fair*. First line, "Australia's sons, let us rejoice". Music and words by P. D. McCormick, about 1885. Adopted, 1977.

AUSTRIA. *Österreichische Bundeshymne*. First line, *Land der berge, land am strome* ("Land of mountains, land of streams"). Music derived from a composition by Wolfgang Amadeus Mozart, 1791. Words by Paula Preradović, 1946. Adopted, 1946.

BAHAMAS. *March on Bahama Land*. First line, "Lift up your heads to the rising sun Bahama Land". Music and words by Timothy Gibson, 1973. Adopted, 1973.

BANGLADESH. *Sonar Bangla*. First line, *Aamar sonar bangla, aami tomai bhalo bashi* ("Oh my golden Bengal, I love you"). Words by Rabindranath Tagore. Adopted, 1971.

BARBADOS. *Barbados National Anthem*. First line, "In plenty and in time of need". Music by Irving Burgie, 1966. Words by C. Van Roland Edwards, 1966. Adopted, 1966.

BELGIUM. *La Brabançonne*. First line, *Après des siècles d'esclavage* ("After centuries of slavery"). Music by François Van Campenhout, about 1830. Words by Charles Rogier, 1860. Adopted, 1938.

BENIN. See DAHOMEY.

BOLIVIA. *Himno Nacional*. First line, *Bolivianos, el hado propicio* ("Bolivians, propitious fate has crowned our hopes"). Music by Benedetto Vincenti. Words by Ignacio de Sanjinés. Adopted, 1842.

BOTSWANA. *Fatshe La Rona* ("Our Country"). Music and words by Kgalemang T. Motsete, 1966. Adopted, 1966.

BRAZIL. *Hino Nacional Brasileiro*. First line, *Ouviram do Ypiranga as margens plácidas* ("From the placid banks of the Ypiranga"). Music by Francisco Manoel, probably 1822. Words

by Joaquim Osório Duque Estrada, 1909. Adopted, 1922.

BULGARIA. *Natsionalniyat Khimn* ("National Hymn"). First line, *Bulgaria mila, zemya na hero* ("Bulgaria, dear, you're the land of our heroes!"). Music by G. Dimitrov, G. Zlatev-Cherkin, and S. Obretenov. Words by Nikola Furnadziev, M. Isacvand, and Elizaveta Bagriana. Adopted, 1946.

BURMA. *A-Myo-Tha Theegyin* ("National Anthem of the Union of Burma"). First line, *Kaba makye bma pyay* ("So long as the war lasted"). Music by U Ba Than. Words by a group of Burmese authors. Adopted, 1948.

BURUNDI. *Hymne National*. First line, "Dear Burundi, oh sweet land". Music and words by a group of composers, 1962. Adopted, 1962.

CAMBODIA (Kampuchea). *Nokoreach* ("Royal City"). First line, *Que le ciel protège notre Roi* ("Heaven protects our king"). Music adapted from an old Khmer song by F. Perruchot and J. Jekyll. Words by Chuon Nat, 1941. Adopted, 1941.

CAMEROON. *Chant de Ralliement* ("Rallying Song"). First line, *O Cameroun, berceau de nos ancêtres* ("Oh Cameroon, that cradled our forefathers"). Music by Samuel Minkyo Bamba and Moise Nyate, 1928. Words by student group and René Jam Afame, 1928. Adopted, 1957.

CANADA. *O Canada*. First line, "O Canada! Our home and native land". Music attributed to Calixa Lavallée, 1880. Words by Judge Robert Stanley Weir, 1908 (French version by Judge Adolphe Basile Routhier, 1879). Adopted, 1967.

CENTRAL AFRICAN EMPIRE. *La Renaissance* ("The Revival"). First line, *O Centrafrique, O berceau des Bantous* ("Oh Central Africa, Oh cradle of the Bantus"). Music by Herbert Pepper, 1958. Words by Barthélemy Boganda, 1958. Adopted, 1960.

CEYLON (Sri Lanka). *Sri Lanka Māthā* ("Mother Lanka We Worship Thee"). Music and words by Ananda Samarakoon. Adopted, 1948.

CHAD. *La Tchadienne* ("The Song of Chad"). First line, "Oh my country, may God watch over you". Music and words by student group from Charles Lwanga, a Catholic college, 1960. Adopted, 1960.

CHILE. *Himno Nacional*. First line, *Dulce patria, recibe los votos* ("Dear country, receive our vows"). Music by Ramón Carnicer, 1828. Words by B. de Vera y Pintado, 1819; revised by Eusebio Lillo, 1847. Adopted, 1847.

CHINA, PEOPLE'S REPUBLIC OF. *National Anthem*. First line, "March on, brave people of our nation". Music by Nie Erh. Words collectively composed. Adopted, 1978.

CHINA, REPUBLIC OF. *San-min-chu-i* ("The Three

Principles of Democracy"). Music by Che'ng Mao-yün, 1928. Words by Sun Yat-sen. Adopted, 1928.

COLOMBIA. *Himno Nacional*. First line, *O gloria inmarcescible* ("Oh unwithering glory"). Music by Oreste Sindice, 1887. Words by Rafael Núñez, 1887. Adopted, 1920.

CONGO, REPUBLIC OF. *La Congolaise* ("The Song of the Congo"). Music and words by Jean Royer, Jacques Tondra, and Jo Spadilière. Adopted, 1960.

CONGO, DEMOCRATIC REPUBLIC OF. See ZAIRE.

COSTA RICA. *Himno Nacional*. First line, *Noble patria, tu hermosa bandera* ("Noble country, thy beautiful flag"). Music by Manuel María Gutiérrez, 1851. Words by José María Zeledón, 1903. Adopted, 1853.

CUBA. *Himno Nacional Cubano*. First line, *Al combate corred Bayameses* ("Rush to combat, citizens of Bayamo"). Music and words by Pedro Figueredo Cisneros (Perucho), 1867-68. Adopted, 1902.

CZECHOSLOVAKIA. *Czechoslovak State Anthem*. This is a combination of two songs: *Kde Domov Můj* ("Where is my Home?") and *Nad Tatrou Sa blýska* ("Lightning strikes our mighty Tatra tempest-shaken"). Music by František Škroup, 1834, and a Slovak folk tune. Words by Josef Kajetán Tyl, 1834, and Janko Matúška, 1844. Adopted, 1919.

DAHOMEY (Benin). *L'Aube Nouvelle* ("The new Dawn"). First line, "Formerly at his call, our ancestors knew without weakness and with courage".

DENMARK. *Der er et Yndigt Land* ("There is a lovely Land"). Music by H. E. Krøyer, 1823. Words by Adam Gottlob Oehlenschläger, 1820. Adopted (unofficially), 1844. Royal anthem: *Kong Christian Stod ved Højen Mast* ("King Christian Stood by Lofty Mast"). Music by Friedrich Kuhlau, 1828. Words by J. L. Heiberg, 1828. Adopted (unofficially), 1828.

DOMINICAN REPUBLIC. *Himno Nacional*. First line, *Quisqueyanos valientes, alcemos nuestro canto* ("Brave Quisqueyanos, let us raise our voices"). Music by José Reyes, 1883. Words by Emilio Prud'homme, 1883. Adopted, 1883.

ECUADOR. *Himno Nacional del Ecuador*. First line, *Salve oh patria mil veces! oh patria!* ("All hail to thee, oh fatherland! oh fatherland!"). Music by Antonio Neumane, 1866. Words by Juan León Mera, 1865. Adopted, 1948.

EGYPT, ARAB REPUBLIC OF. *The Republican Hymn*. Music by Kamal el-Tawil.

EL SALVADOR. *Himno Nacional*. First line, *De la paz en la dicha suprema* ("For peace and supreme happiness"). Music by Juan Aberte.

Words by Juan J. Cañas, 1879. Adopted, 1953.

ETHIOPIA. *Etiopia hoy, des Yibalish* ("Let Ethiopia be joyous"). Music by M. K. Nalbandian, 1925. Words by group of Ethiopians, 1930.

FINLAND. *Maamme* ("Our Land"). First line, *Oi maamme suomi synnyiumaa*. Music by Fredrik Pacius, 1848. Words by Johan Ludvig Runeberg, 1846. Adopted, 1848.

FRANCE. *La Marseillaise* ("The Song of Marseille"). First line, *Allons, enfants, de la patrie* ("Ye sons of France, awake to glory"). Music and words by Claude Joseph Rouget de Lisle, 1792. Adopted, 1795.

GABON. *La Concorde* ("The Concord"). First line, "United in concord and fraternity". Music and words by George Damas, 1960. Adopted, 1960.

GAMBIA. *National Anthem*. Music by J. F. Howe, 1964. Words by Mrs. V. J. Howe, 1964. Adopted, 1965.

GERMAN DEMOCRATIC REPUBLIC (East Germany). *Auferstanden aus Ruinen* ("Arisen from the Ruins"). Music by Hanns Eisler. Words by J. R. Becker, 1949. Adopted, 1949.

GERMANY, FEDERAL REPUBLIC OF (West Germany). *Deutschland-Lied* ("Song of Germany"). First line, *Einigkeit und Recht und Freiheit* ("Unity and right and freedom"). Music based on a melody by Franz Joseph Haydn, 1797. Words by August Heinrich Hoffmann von Fallersleben, 1841. Adopted, 1952.

GHANA. *Ghana National Anthem*. First line, "God bless our homeland Ghana". Music by Phillip Ghebo, 1957. Words revised by nine-member committee, 1967. Adopted, 1957.

GREAT BRITAIN. *God Save the Queen*. First line, "God save our gracious queen". Author and composer, anonymous. First performed, 1745.

GREECE. *Ymnos stin Eleutheria* ("Hymn to Liberty"). First line, *Se gnōrizō apo tēn kopsi tu spatjiē ten tromerē* ("I know you by the sharpness of your sword"). Music by N. Mantzaros, 1828. Words by Dionysios Solomos, 1824. Adopted, 1863.

GUATEMALA. *Himno Nacional*. First line, *Guatemala feliz* ("Happy Guatemala"). Music by Rafael Álvarez, 1880. Words by Joaquín Palma, 1896. Adopted, 1896.

GUINEA. *Alpha Yaya* ("Freedom"). First line, "Glory to our ancestors' and our elders' struggle for Africa's independence". Music by Keita Fodéba and J. Cellier, 1958. Words by Orchestra of the Republican Guard, 1958. Adopted, 1958.

GUYANA. *Guyana's National Anthem*. First line, "Dear land of Guyana, of rivers and plains". Music by Robert C. G. Potter, 1966. Words by Reverend Archibald Luker, 1965. Adopted, 1966.

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HAITI. *La Dessalinienne* ("The Song of Dessalines"). First line, *Pour le pays, pour les ancêtres* ("For country, for ancestors"). Music by Nicolas Geffrard, 1903. Words by Justin Lhérisson, 1903. Adopted, 1903.

HONDURAS. *Himno Nacional*. First line, *India virgen y hermosa dormías* ("While you dreamed, Indian virgin beauty"). Music by Carlos Hartling, 1904. Words by Augusto C. Coello, 1903. Adopted, 1915.

HUNGARY. *Himnusz*. First line, *Isten áldd meg a Magyart* ("God bless the Hungarians"). Music by Ferencz Erkel, 1845. Words by Ferencz Kölcsey, 1823. Adopted, 1845.

ICELAND. *O Gud vors Land* ("Oh God of our Land"). Music by Sven Sveinbjörnsson. Words by Mathias Jochumsen, 1874. Adopted, 1874.

INDIA. *Jana-Gana-Mana*. First line, *Jana-gana-mana adhinayaka jaya he* ("Thou art the ruler of the minds of all people"). Music and words by Rabindranath Tagore. Adopted, 1950.

INDONESIA. *Indonesia Raya* ("Great Indonesia"). First line, *Indonesia tanah airku* ("Indonesia our native country"). Music and words by Wage Rudolf Supratman, 1928. Adopted, 1949.

IRAN. *Salamé Shahanshahi va suroodé Melli Iran*. First line, "Long live our Shahanshah". Music by Davood Nagemi, 1934. Words by Muhammad Hashem Afssar, 1934. First performed, 1934.

IRAQ. *Al-Salaam al-Jumhuriya* ("Salute of the Republic"). Music by A. Chaffon. Adopted, 1959.

IRELAND, REPUBLIC OF. *Amhrán na bhFiann* ("The Soldier's Song"). First line, "We'll sing a song". Music by Peadar Kearney and Patrick Heaney, before 1911. Words by Peadar Kearney, about 1908. Adopted, 1926.

ISRAEL. *Hatikvah* ("The Hope"). First line, "Oh while within a Jewish breast". Music by Samuel Cohen, based on Jewish folk tune. Words by Naphtali Herz Imber, 1878. Adopted, 1948.

ITALY. *Inno di Mameli* ("Mameli's Hymn"). First line, *Fratelli d'Italia, l'Italia s'e' desta* ("Italian brothers, Italy has arisen"). Music by Michele Novaro, 1847. Words by Goffredo Mameli, 1847. Adopted, 1946.

IVORY COAST. *L'Abidjanaise* ("Song of Abidjan"). First line, "Salute, oh land of hope". Music by Pierre Michel Pango. Words by Mathieu Ekra with the help of Joachim Bony and the Abbé Coty. Adopted, about 1960.

JAMAICA. *Jamaica National Anthem*. First line, "Eternal Father, bless our land". Music and words by group of Jamaicans, 1962. Adopted, 1962.

JAPAN. *Kimigayo* ("The Reign of Our Emperor"). First line, *Kimi ga yo wa* ("Ten thousand years of happy reign be thine"). Music by Hiro-mori Hayashi, probably 1881. Words taken from an ancient poem. Adopted, 1888.

JORDAN. *Ash al-Malik* ("Long live the King"). Words by H. E. Abdel Mune'im al Rifai, 1937. Adopted, 1938.

KAMPUCHEA. See Cambodia.

KENYA. *Wimbo Wa Taifa* ("National Anthem"). First line, *Ee Mungu nguvu yetu* ("O God of all creation"). Music and words by a group of citizens. Adopted, 1963.

KOREA, REPUBLIC OF (South Korea). *Aegug-ga* ("Patriotic Hymn"). First line, *Donghae mulgwa Baegdusani* ("Donghae Main and Paektu Mountain"). Music by An Ik-Tai. Words by Yun Ch'i-Ho. Adopted, 1948.

KOREA, DEMOCRATIC PEOPLE'S REPUBLIC OF (North Korea). Untitled. Music by Kim Wön-Gyun. Words by Pak Se-Yöng. Adopted, 1947.

KUWAIT. *Salam-al-Kuwait al-Watani* ("Kuwait National Anthem").

LAOS. *Pheng Xat Lao* ("Laos National Anthem"). First line, "Our Lao race had once known a great reputation in Asia". Music by Dr. Thongdy Sounthone-Vichit, 1943. Words by Maha Phoumi Chitaphong, 1943. Adopted, 1943.

LEBANON. *Hymne National Libanaïs*. First line, *Koullouna lilouatann Liloula lil a lam* ("All of us are for the country"). Music by Wadia Sabra. Words by Rachid Nakhle. Adopted, 1927.

LESOTHO. *Lesotho Fatse La Bo-nata Rona* ("Lesotho, the Country of Your Fathers").

LIBERIA. *Liberian National Anthem*. First line, "All hail Liberia, hail!". Music by Olmstead Luca, 1860. Words by Daniel Bashiel Warner, 1847.

LIBYA. *Al-Nashid al-Watani* ("National Anthem"). First line, *Ya biladi* ("Oh my country"). Music by Muhammad Abdul. Words by al-Bashkir al-Arebi. Adopted, 1951.

LIECHTENSTEIN. *Oberst am Deutschen Rhein* ("High above the German Rhine"). Music to the tune of *God Save the Queen*. Words by H. H. Jauch, 1850. Adopted, 1951.

LUXEMBOURG. *Ons Hémécht* ("Our Fatherland"). First line, "Where you see the slow Alzette flow". Music by Antoine Zinnen, 1864. Words by Michel Lentz, 1863. Adopted, 1880.

MALAGASY REPUBLIC (Madagascar). *Ry Tanindrazanay Malala*, ô. First line, "Oh, beloved land of our fathers". Music by Norbert Raharisoa, words by Pasteur Rahajason, 1958. Adopted, 1958.

MALAWI. *Mlungu Dalitsani Malawi* ("Oh God, bless the Land of Malawi"). First line, "Oh God, bless the land of Malawi, keep it a land of

peace". Music and words by Michael Fred P. Sauka, 1964. Adopted, 1964.

MALAYSIA. *Negaraku* ("My Country"). Music based on old Malayan folk tune. Adopted, 1957.

MALI. *Hymne National Malien*. First line, "To your call, Mali, for your prosperity".

MALTA. *Innu Malti* ("Hymn of Malta"). First line, *Lil din l-Art helwa, l-Omm li tatna isimha* ("Guard her, Oh Lord as ever Thou hast guarded"). Music by Robert Samut, about 1923. Words by Dun Karm Psaila, 1923. Adopted, 1964.

MEXICO. *Himno Nacional*. First line, *Ciñal oh patria! tus sienes de oliva*. ("Bind up, my country, your temples with a crown of olives"). Music by Jaime Nunó. Words by Francisco González Bocanegra. Adopted, 1943.

MONACO. *Hymne Monégasque*. First line, *Principauté Monaco, ma patrie* ("Principality of Monaco, my fatherland"). Music by Bellando de Castro. Words by Louis Canis. First performed, 1867.

MONGOLIAN PEOPLE'S REPUBLIC. *Bugd Nairamdakh Mongol or Ulsyn Suld Duulal* ("Anthem of our Country" or "Our free revolutionary Land").

MOROCCO. *Hymne Chérifien* ("Hymn of the Sharif").

NEPAL. *National Anthem for H.M. the Maharaja Dhiraja*. First line, *Sreeman ghambir nepali prachanda pratapi mahadhipati* ("May glory crown you, courageous sovereign"). Adopted, 1952.

NETHERLANDS. *Wilhelmus van Nassouwe* ("William of Nassau"). First line, "William of Nassau, scion of a Dutch and ancient line". Music is a popular 16th-century Huguenot melody. Words attributed to Marniz van Saint Aldegonde. Adopted, 1932.

NEW ZEALAND. *God Save the Queen* (same as Great Britain). National song: *God Defend New Zealand*. First line, "God of nations! at thy feet". Music by John Joseph Woods, about 1875. Words by Thomas Bracken, about 1875. Adopted, 1940.

NICARAGUA. *Himno Nacional*. First line, *Salve a ti Nicaragua en tu suelo* ("Hail to you Nicaragua in thy Earth"). Music by Victor Manuel Zuniga, 1939. Words by Salomón Ibarra Mayorga, 1918. Adopted, 1939.

NIGER. *Hymne National Nigérien*. First line, "By the great, mighty Niger".

NIGERIA. *Nigeria a Kí O*. First line, "Nigeria, we hail thee". Music by Frances Benda, 1959. Words by L. J. Williams, 1959. Adopted, 1960.

NORWAY. *Ja, Vi Elsker Dette Landet* ("Yes, We love with fond Devotion"). Music by Rikard Nordraak, about 1863-64. Words by Bjørnstjerne Bjørnson, 1859. Adopted, 1864.

PAKISTAN. *Qaumi Tirana* ("National Anthem"). First line, *Pak sar zamin shad bad* ("Blessed be the sacred land"). Music by Ahmed G. Chagla, 1950. Words by Abdul-Nasr Hafeez Jullundhri, 1951. Approved, 1954.

PANAMA. *Himno Nacional*. First line, *Alcanzamos por fin la victoria* ("We have finally reached victory"). Music by Santos Jorge. Words by Jeronimo Ossa, 1904. Adopted, 1925.

PARAGUAY. *Himno Nacional*. First line, *Paraguayos, república o muerte* ("Paraguayans, republic or death"). Music by Francés Dupuy. Words by Francisco Acuña de Figueroa. Adopted, 1846.

PERU. *Himno Nacional*. First line, *Somos libres, seamoslo siempre* ("We are free, let us remain so forever"). Music by José Bernardo Alcedo, rewritten by Claudio Rebagliati. Words by José de la Torre Ugarte, 1821. Adopted, 1821.

PHILIPPINES. *Marcha Nacional Filipina*. First line, *Tierra adorada* ("Beloved Land"). Music by Julian Felipe, 1898. Words by Jose Palma, 1899.

POLAND. *Polski Hymn Narodowy* ("Polish National Anthem"). First line, *Jeszcze Polska nie zginęła* ("Poland has not yet perished"). Music based on a Polish folk song. Words by Józef Wybicki, 1797. Adopted, 1918.

PORTUGAL. *A Portuguesa*. First line, *Heróis do mar* ("Heroes of the sea"). Music by Alfredo Keil, 1910. Words by H. Lopes de Mendonça, 1890. Adopted, 1910.

RUMANIA. *Te Slăvim, România* ("We praise Thee, Fatherland Rumania"). Music by M. Socor. Words by E. Frunza and D. Deshir. Adopted, 1953.

RWANDA. *Rwanda Rwacu*. First line, *Rwanda rwacu, gihugu cyembyaye*. Music and words by Abanyuramatwi b'i Gitarama, 1962. Adopted, 1962.

SAN MARINO. *Onore a Te, Onore O Antica Repubblica* ("Honor to Thee, Honor O ancient Republic"). Music by Federico Consolo. Words by Giosuè Carducci. Adopted, 1894.

SAUDI ARABIA. *al-Salaam al-Malaki al-Saud* ("Royal Salute of Saud"). First line, "Long live our beloved King". Music by General Tarik Abdul Haikim. Words by Abdul-Rahman Alkatib. Adopted, 1950.

SENEGAL. Untitled. Music by Léopold-Sédar Senghor.

SIERRA LEONE. *Sierra Leone National Anthem*. First line, "High we exalt thee, realm of the free". Music by John Akar, 1961. Words by C. N. Fyle, 1961. Adopted, 1961.

SINGAPORE. *Majallah Singapura* ("Singapore Progress"). Music and words by Haji Zubir Said.

NATIONAL ANTHEMS

SOMALIA. *Somalia Hanoiato* ("Long Live Somalia"). Music by Giuseppe Blanc, 1960. Adopted, 1960.

SOUTH AFRICA. *Die Stem van Suid-Afrika* ("The Call of South Africa"). First line, *Uit die blou van onse hemel, uit die diepte van ons see* ("Ringing out from our blue heavens, from our deep seas breaking round"). Music by Reverend M. de Villiers, 1928. Words by C. J. Langenhoven, 1918. Adopted 1938.

SPAIN. *Himno Nacional*. First line, *Viva España, alzad los bravos hijos del pueblo español, que vuelve a resurgir* ("Long live Spain, raise your arms, sons of the Spanish country"). Music is a popular 18th-century Spanish melody. Words by José María de Man, about 1940. Adopted, 1937.

SRI LANKA. See CEYLON.

SUDAN. *Jundi al-Allah* ("Soldiers of God"). First line, "We are the soldiers of God, soldiers of this our land". Music by Sudan Army Band, 1955. Words by Ahmed Muhammad Salih, 1955. Adopted, 1956.

SURINAM. *The National Anthem of Surinam*. First line, "Praise and honor to our country". Music by J. C. de Puij, 1876. Words by H. de Ziel, 1893. Adopted, 1959.

SWEDEN. *Du Gamla, du Fria* ("The Swedish National Anthem"). First line, *Du gamla, du fria, du fjällhöga Nord* ("Thou ancient, thou freeborn, thou mountainous North"). Music based on German folk tune. Words by Richard Dybeck, 1844. Popularized, late 19th century.

SWITZERLAND. (Ger.) *Schweizer Psalm*; (Fr.) *Cantique Suisse*; (It.) *Salmo Svizzero*; (Romansh) *Psalm Svizzer* ("The Swiss Hymn"). First line, "On the mountains, when the sun proclaims a radiant morn". Music by Father Albrecht Zwyssig. Words by Leonhard Widmer. Adopted, 1961.

SYRIA. *al Nashid Alwatani* ("Syrian National Anthem"). First line, "Defenders of the homeland, greetings". Music by Fulayfel brothers. Words by Khalil Mardam Bey. Adopted, 1939.

TANZANIA. *Wimbo Wa Taifa* ("National Anthem"). First line, *Mungu ibariki Afrika* ("God bless Africa"). Music by Enoch Sontonga and V. E. Webster, 1961. Words by group of Tanzanian citizens, 1961. Adopted, 1961.

THAILAND. *Phleng Chat* ("National Anthem"). Music by Phra Chenduriyang. Words by Luang Saranuprabhandh. Adopted, 1939. Royal anthem: *Phleng Sansoen Phra Barami*. Adopted, 1872.

TOGO. *Terre de Nos Aïeux* ("Land of our Fathers"). Music and words by Alex Casimir-Dosse. First sung officially, 1960.

TRINIDAD AND TOBAGO. *The National Anthem*

of Trinidad and Tobago. First line, "Forged from the love of liberty". Music and words by Patrick S. Castagne, 1962. Adopted, 1962.

TUNISIA. *The National Official Anthem of the Republic of Tunisia*. First line, "Oh dear martyr's blood, make our battle for freedom eternal". Music by Salahedine Nakach. Words by Salah el-Mahdi. Adopted, 1957.

TURKEY. *Istiklâl Marşı* ("Turkish National Anthem"). First line, *Korkma! Sönmez bu şafaklarda yüzen al sancak* ("Should the last fireplace on our fatherland cease to smoke"). Music by Osman Zeki Üngör, 1922. Words by Mehmet Akif Ersoy, 1921. Words adopted as poem, 1921.

UGANDA. *Uganda National Anthem*. First line, "Oh Uganda! thy people praise thee". Music by G. W. Kakoma. Words by G. W. Kakoma and P. Wingard. Adopted, 1962.

U.S.S.R. *Gimn Sovetskogo Soyuza* ("Hymn of the Soviet Union"). First line, "Unbreakable union of freeborn republics". Music by Alexander Vassilevich Alexandrov, around 1942. Words by Sergey Mikhalkov and I. Registan, 1944. Adopted, 1944.

UNITED STATES. *The Star-Spangled Banner*. First line, "Oh say, can you see by the dawn's early light". Music by John Stafford Smith. Words by Francis Scott Key, 1814. Adopted, 1931.

UPPER VOLTA. *La Volta*. First line, "Proud Volta of our forefathers". Music and words by Abbé Robert Ouedraogo, 1960. Adopted, 1960.

URUGUAY. *Himno Nacional*. First line, *Orientales, la patria ó la tumba* ("Easterners, the fatherland or the tomb"). Music and words by Juan Copetti. Adopted, 1948.

VATICAN CITY. *Marche Pontificale*. Music by Charles Gounod. Adopted, 1950.

VENEZUELA. *Himno Nacional*. First line, *Gloria al bravo pueblo* ("Glory to the brave people"). Music by Juan José Landaeta, about 1810. Words by Vicente Salas. Adopted, 1881.

VIETNAM. *Tien Quan Ça* ("Forward, Soldiers!"). Music by Do Hu Ich. Words by Van Cao.

YEMEN ARAB REPUBLIC. *al-Watani* ("Peace to the Land").

YUGOSLAVIA. *Hej Slaveni*. Music based on folk song. Words, anonymous. Adopted, 1945.

ZAIRE, REPUBLIC OF. *Debout, Congolais* ("Rise, Congolese"). Music and words by J. Lutumba and S. Boka, 1961. Adopted, 1961, as the national anthem of the Democratic Republic of the Congo.

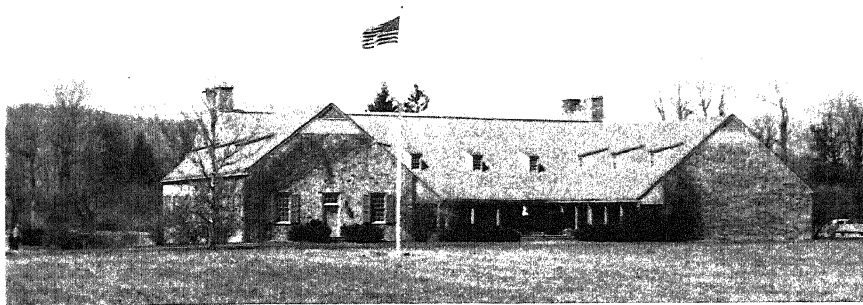
ZAMBIA. *The National Anthem*. First line, "Stand and sing of Zambia, proud and free". Music from hymn "God Bless Africa". Words by Mrs. Walters and D. W. Dunn, 1964. Adopted, 1964.

NATIONAL ASSOCIATION FOR THE ADVANCEMENT

NATIONAL ARCHIVES AND RECORDS SERVICE, known also as N.A.R.S., institution under the direction of the archivist of the United States, established by the General Services Administration (q.v.) in 1949. The N.A.R.S. succeeded the National Archives Establishment which was created in 1934 by Congress. Its purpose is to select, preserve, and make available to

Johnson libraries; the latter was completed in 1971.

Presidential proclamations, Presidential executive orders, and general regulations issued by Federal agencies are legally valid only when published in the N.A.R.S. daily *Federal Register*; codification of all regulatory documents is contained in the *Code of Federal Regulations*. The



the Federal government and the public historically valuable government records. The institution also publishes laws, Constitutional amendments, Presidential documents, and administrative regulations. It is responsible for the preservation of documents such as the Declaration of Independence and the Constitution of the United States (qq.v.) and administers the Presidential libraries and Federal records centers. These functions are performed by six main offices.

The National Archives Building in Washington, D.C., is the repository of most of the permanently valuable records of the U.S. government. Such records include treaties, laws, Presidential proclamations and executive orders, military reports, records of Indian affairs, census schedules, historically significant maps and charts, sound recordings, motion pictures, and still pictures, notably the valuable collection of American Civil War photographs by Mathew B. Brady (q.v.). On permanent display in the Exhibition Hall are the Declaration of Independence, the Constitution of the United States, the Bill of Rights (qq.v.), and other documents dating from the period 1774-90.

Presidential libraries that are coordinated by the N.A.R.S. include the Herbert Hoover Library, the Franklin D. Roosevelt Library, the Harry S. Truman Library, and the Dwight David Eisenhower Library. The Office of Presidential Libraries participated as well in the planning for the John Fitzgerald Kennedy and Lyndon Baines

The Franklin D. Roosevelt Library in Hyde Park, N.Y., established in 1939. The Federal library is part of the National Archives.

Franklin D. Roosevelt Library

N.A.R.S. also publishes the weekly *Compilation of Presidential Documents*, the statutes at large, the *United States Government Organization Manual*, and the public papers of the Presidents.

NATIONAL ASSOCIATION FOR THE ADVANCEMENT OF COLORED PEOPLE, known also as N.A.A.C.P., nonprofit, nonpartisan organization, founded in 1909, and dedicated to the promotion of economic, political, civic, and social betterment for Negroes and other minority groups in the United States and its territories. Membership in the N.A.A.C.P., which is incorporated under the laws of the State of New York, is open to all persons without regard to creed or color. The organization is governed by a sixty-four-member board of directors who are elected by the membership for three-year terms. Seven of these board members are elected by the youth membership. The president and other officers are elected annually by the board of directors. Representatives of the membership meet in an annual convention to establish policy and programs of action. In 1973 the N.A.A.C.P. had about 425,000 members belonging to 1500 branches, youth councils, and college chapters throughout the U.S. The youth membership of 53,000 in 1973 constitutes the largest body of organized youth in the area of civil rights. Publications of the organization in-

NATIONAL ASSOCIATION FOR THE ADVANCEMENT

clude a monthly magazine, *The Crisis*, founded in 1910 by the American sociologist, educator, and author William E(dward) B(urghardt) Du Bois (q.v.), who remained its editor until 1934. The N.A.A.C.P. maintains a Washington bureau and eight regional and area offices. National headquarters are in New York City.

The credo of the N.A.A.C.P. is that all people are inherently equal and must be so treated. It works to seek equality for Negroes and other minorities by seeking redress in the courts, by advocating the enactment of civil-rights legislation, and by conducting a public-information program. It defends the right of every citizen to have equal opportunity in education, employment, and housing. It opposes, by all available legal means, segregation in public facilities, and it lobbies for the enactment of antidiscrimination legislation on Federal, State, and local levels. The legislative program is complemented by campaigns to increase the number of voters among Negroes and other minorities. In its public-information program the N.A.A.C.P. attempts to give wide publicity to conditions and situations that it believes militate against equality of opportunity.

History. In January, 1909, the white social reformers Mary White Ovington (1865–1951), William English Walling (1877–1936), and Henry Moskowitz (1880–1936) met in New York City to discuss ways of eliminating discrimination against Negroes in the U.S. The plight of the Negro population had been dramatized by a severe race riot in Springfield, Ill., the previous year. In response to a call issued on Feb. 12, 1909, by sixty distinguished Negroes and whites, a conference was held (May 31–June 1, 1909) in New York City. Although Lincoln's Birthday, 1909, is usually considered the date of the founding of the N.A.A.C.P., the permanent organization was actually the outgrowth of a second conference in May, 1910.

The N.A.A.C.P., in its first major legal action, challenged the so-called grandfather clause of the Oklahoma State constitution. The clause, which in effect excluded the Negro from the ballot, was declared unconstitutional by the Supreme Court of the United States (q.v.) in 1915. In 1917 the N.A.A.C.P. successfully opposed, before the Supreme Court, a Louisville, Ky., municipal zoning law that established segregated housing for Negroes. The N.A.A.C.P. unsuccessfully opposed the segregation of Negroes in the U.S. armed forces during World War I. The organization made repeated vain attempts in the postwar period to secure enactment of a Federal anti-lynching law; see LYNCHING. Largely as a re-

sult of public approval of its unrelenting struggle against lynchings, however, outbreaks of mob violence against Negroes became less and less frequent.

The N.A.A.C.P. renewed its opposition to the segregation of Negroes in the armed forces during World War II. This segregation was finally abolished soon after the war. During the same period, the organization won many outstanding legal victories in its struggle against discriminatory practices in State-supported institutions of higher learning, and it led the fight that resulted in 1946 in the Supreme Court decision declaring segregation unconstitutional in interstate travel. The N.A.A.C.P. won its most important legal victory when, on May 17, 1954, the Supreme Court ruled unanimously that racial segregation in the public schools is unconstitutional. Since that time the N.A.A.C.P. has been in the forefront of the legal struggle to enforce the Supreme Court decision. The N.A.A.C.P. largely influenced the passage of the civil-rights legislation passed between 1957 and 1968. See CIVIL RIGHTS AND CIVIL LIBERTIES; DISCRIMINATION; NEGROES IN THE UNITED STATES; NEGRO ORGANIZATIONS. *Professional and Civil Rights Organizations.* R.Wi.

NATIONAL ASSOCIATION OF MANUFACTURERS (N.A.M.), voluntary association of American manufacturing firms, founded in Cincinnati, Ohio, in January, 1895, at a convention of several hundred industrialists. The main purposes of the N.A.M. are (1) to help improve labor relations and management techniques; (2) to inform its members of developments in business, government, and public opinion that may be of interest to them; (3) to disseminate publicity designed to educate the American people to an appreciation of the merits of the American free-enterprise system; (4) to combat policies and practices of business and labor that may be inimical to the interests of its members; and (5) to serve as watchdog and spokesman for industry on legislation.

About 12,000 firms were members of the N.A.M. in 1972. The N.A.M. has headquarters in Washington, D.C., and offices in New York City, and 7 regional offices across the nation.

NATIONAL AUDUBON SOCIETY, national conservation organization, devoted to "promoting the conservation of wildlife and the natural environment, and educating man regarding his relationship with, and his place within, the natural environment as an ecological system". It has more than 300 local chapters and about 275 affiliated groups. The first Audubon Society was founded in 1886 and named for the American naturalist John James Audubon (q.v.). Audubon

societies were formed in many localities, and in 1905 they were consolidated into a national organization with headquarters in New York City.

The sanctuary program of the society provides protection for fifty different areas of land and water, ranging in size from small offshore islands to a 26,000-acre tract of coastal marshland. Its educational services include nature centers and summer workshops for adults and children, and publication of a variety of teaching materials on nature and conservation. It publishes *Audubon Magazine*, which deals with wildlife and conservation; *American Birds*, incorporating *Audubon Field Notes*, a journal about birds in North America; and a newsletter covering developments in conservation legislation and related matters.

The society also sponsors field research and provides expert testimony on behalf of conservation legislation. In 1973 membership in the national organization was about 300,000.

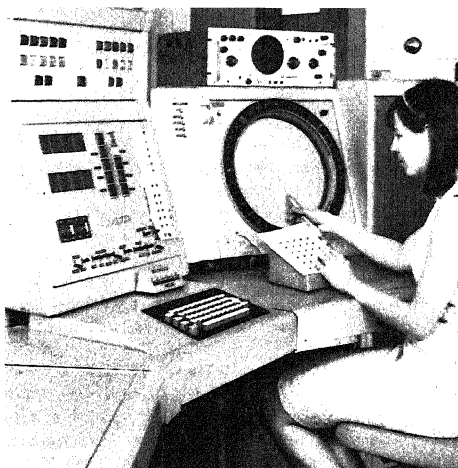
NATIONAL BANKS. See BANKS AND BANKING.

NATIONAL BASEBALL HALL OF FAME AND MUSEUM. See BASEBALL HALL OF FAME AND MUSEUM, NATIONAL.

NATIONAL BOOK AWARDS, series of awards presented annually for books considered by panels of judges to be the most distinguished books written by American citizens and published in the United States the preceding year. Each award winner receives a \$1000 prize. The awards, which were first made in 1950, are given in the following categories: biography and autobiography, contemporary thought, fiction, history, poetry, translation, and children's literature.

Until 1975 the awards were administered by the National Book Committee, a nonprofit association. Since 1977 they have been the responsibility of the Association of American Publishers. Prizes have been donated by various industry organizations.

NATIONAL BUREAU OF STANDARDS, also known as the N.B.S., agency of the United States Department of Commerce (q.v.), established by Congress in 1901 as the central measurement laboratory of the Federal government. The bureau is also a principal focal point in the U.S. for assuring maximum application of the physical and engineering sciences to the advancement of technology in industry and commerce. It comprises the Institute of Basic Standards, Institute for Materials Research, Institute for Applied Technology, Center for Radiation Research, Center for Computer Sciences and Technology, and the Office for Information Programs. The N.B.S. promotes the use of precision technology



A linguist using MAGIC (Machine for Automatic Graphics Interface to a Computer) at the National Bureau of Standards Center for Computer Sciences and Technology. The device is used for forming language characters and a lexicon of their components.

National Bureau of Standards

by conducting research and providing central national services in four broad program areas: basic measurements and standards, materials measurements and standards, technological measurements and standards, and transfer of technical information.

The bureau provides a central basis within the U.S. of a complete and consistent system of basic physical measurement and standards, and furnishes essential services leading to accurate and uniform physical measurements throughout the scientific community, industry, and commerce. In 1972, for example, N.B.S. scientists developed a helium-neon gas-laser technique that for the first time gave the precise measurement of the speed of light as 186,282.396 mi. per sec.

The bureau also cooperates with public and private organizations in the development of technological standards and test methodologies by conducting materials research, leading to improved methods of measurement standards and data collection on the properties of materials needed by industry, commerce, educational institutions and governmental bodies. It relates the physical and chemical properties of materials to their behavior and their interaction with their environments, and has made significant contribution in the field of fire and motor-vehicle safety. In the 1970's the N.B.S. became involved in the fields of energy conservation in the home, office, and industry, in the measurement of environmental pollution, and in the investigation of the hazards of many consumer products.

NATIONAL CEMETERIES

The third main activity of the N.B.S. is the development of technical services to promote the use of available technology so as to facilitate innovation and precision in industry and governmental institutions. It engages in research, measurement and application of radiation (q.v.) to the solution of technological problems.

Finally, at Federal, State, and local government level, the bureau provides advisory and research services to all agencies by developing, producing, and distributing standard-reference materials. It promotes optimum dissemination and accessibility of scientific information generated within the N.B.S. and the other agencies of the Federal government. In this, the bureau is assisted by its development of the National Standard Reference Data System, and a system of information-analysis centers dealing with the broader aspects of the national measurement system. Because of its unique data-gathering functions, the N.B.S. is the principal agent for the development of Federal standards for automatic data processing techniques, equipment, and for computer languages. See AUTOMATION; COMPUTER.

NATIONAL CEMETERIES, in the United States, special places of burial (q.v.) in honor of the dead of the American armed forces. National cemeteries were first authorized in 1862 during the Civil War. Today the Federal government oversees ninety-five such memorial sites across the country, of which twenty-eight are filled and inactive. The cemeteries are maintained by the Department of the Army which, under the responsibility of the chief of support services, cares for eighty-five cemeteries and several Confederate cemeteries; and by the National Park Service (q.v.), which is responsible for ten cemeteries in or near national parks. The chief of support services is in charge of all interment authorizations, burial records, and procurement of headstones and monuments. Since 1923 the design and erection of all grave markers has been the jurisdiction of the American Battle Monuments Commission.

Two of the most widely known military cemeteries in the U.S. are Arlington National Cemetery (q.v.) and that at Gettysburg (q.v.), Pa. The commission also maintains eight World War I cemeteries honoring American dead on foreign soil, and fourteen sites for U.S. servicemen killed in World War II. The majority of these are located in Western Europe.

NATIONAL CITY, city of California, in San Diego Co., on San Diego Bay and adjoining San Diego on the S. Site of naval station and headquarters of the Pacific Reserve fleet, it is also a

terminus of the Santa Fe Railroad. The surrounding area has lemon groves and truck farms. Industries of the city include oil refining, fruit and vegetable packing, ship repairing, and the manufacture of lumber and furniture, electronic equipment, and metal products. The site was bought for development from a ranch in 1868 and called National Ranch. The name was changed to National City in 1871, but the railroad station was called Nación until 1886. The city was incorporated in 1887. Pop. (1960) 32,771; (1970) 43,184.

NATIONAL COLLECTION OF FINE ARTS. See SMITHSONIAN INSTITUTION.

NATIONAL COLLEGIATE ATHLETIC ASSOCIATION, known as the N.C.A.A., voluntary association, founded in 1906, of 712 member institutions and affiliated associations devoted to the administration of intercollegiate athletics. Activities of the N.C.A.A. include the maintenance of professional communication for administrators and coaches, the enforcement of a detailed code of regulations established by twelve rules committees, and the administration of annual championship events in sixteen sports, including baseball, basketball, cross-country, golf, gymnastics, swimming, tennis, track and field, and wrestling. Among the publications of the organization are the Official Guides, covering nine sports, and the compilations of statistics for college baseball, basketball, and football. Acting as the administrative agency for colleges in international athletic events, the N.C.A.A. also annually awards eighty postgraduate scholarships to outstanding student-athletes and gives financial and other assistance to various groups interested in the promotion and encouragement of intercollegiate and intramural athletics. Headquarters is in Kansas City, Mo.

NATIONAL CONFERENCE OF CHRISTIANS AND JEWS, American civic organization devoted to putting into action the concept of liberty and justice for all. The organization was founded in 1928 by a group of prominent Americans, including the statesman and jurist Charles Evans Hughes, the lawyer Newton Diehl Baker, and the clergyman Samuel Parkes Cadman (qq.v.). Drawing support from interested people from all groups, especially business and industry, the N.C.C.J. is dedicated to combating all forms of bigotry. The organization sponsors programs to foster equality of opportunity in education, employment, and cultural activities. It stresses the need for brotherhood, and is the originator of National Brotherhood Week, which was observed annually in February until

1969; in that year Brotherhood Commitment was instituted as a year-round effort. The organization is governed by a national board of trustees, from whose number is elected a board of governors and an executive committee. The latter body is responsible for day-to-day operations. National headquarters is in New York City.

NATIONAL CONGRESS OF PARENTS AND TEACHERS. See PARENTS AND TEACHERS, NATIONAL CONGRESS OF.

NATIONAL CONVENTION, in the history of republican France, the third assembly of the deputies chosen after the onset of the French Revolution (q.v.) in 1789, and the one which assumed the government of France upon the overthrow of the monarchy in 1792. The Convention soon became subject to the increasing dictatorial power of the deputy Maximilien François Robespierre (q.v.) and eventually dissolved itself, Oct. 26, 1795, turning the government over to the new Directory (q.v.). See COMMITTEE OF PUBLIC SAFETY.

NATIONAL COUNCIL OF CATHOLIC LAITY. See NATIONAL COUNCIL OF CATHOLIC MEN.

NATIONAL COUNCIL OF CATHOLIC MEN, American Roman Catholic organization founded in the United States in 1920. In 1971 the council joined with the National Council of Catholic Women and other national lay organizations to form the National Council of Catholic Laity. Operating from within the framework of this new federation, the council promotes cooperation among Catholic layman societies, represents Catholic laity in the U.S. in national and international movements involving moral questions, and serves as a liaison between the laity and the Catholic hierarchy by means of the United States Catholic Conference. The council disseminates information through publications, national meetings, action programming, and its bimonthly periodical *People*.

The organization serves 6,000,000 Catholic laymen in the U.S., and consists of 35 archdiocesan and diocesan councils of men, 14 State councils of the Knights of Columbus (q.v.), 1000 parish and overseas military-group affiliates, and 11 other national organizations. The council, which has 4500 contributing members, maintains headquarters in Washington, D.C.

NATIONAL COUNCIL OF THE CHURCHES OF CHRIST IN THE UNITED STATES OF AMERICA, cooperative agency of religious bodies in the United States. The council was established in 1950 to strengthen unity among its member churches and organizations. It is composed of thirty-one Protestant and Eastern Or-

thodox denominations, representing some 42,000,000 members. The council was formed through a merger of the Federal Council of the Churches of Christ in America with eleven other interdenominational bodies. The activities of the council are directed by a governing board, which meets two times a year, and is composed of delegates from member denominations. The programs of the council are carried out through its three main divisions: Christian education, church and society, and overseas ministries. The Revised Standard Version of the Bible was produced by a committee of scholars under the auspices of the division of Christian education of the council, which holds the copyright to this version of the Scriptures. Council headquarters are in New York City.

NATIONAL COVENANT. See COVENANTERS.

NATIONAL DEBT. See DEBT, NATIONAL.

NATIONAL EDUCATION ASSOCIATION OF THE UNITED STATES, also known as N.E.A., independent, voluntary, nongovernmental organization open to professional educators, incorporated by Congress in 1906 after existing as the National Teachers Association (1857-70) and the National Educational Association (1870-1906). Its purpose is the improvement of American education and the advancement of the interest of teachers. It is the world's largest publisher of audio-visual materials and publications on professional education; its publications include *Today's Education*, the quarterly journal of the N.E.A., published during the school year, *NEA Reporter*, and the annual *Addresses and Proceedings*.

The National Education Association of the U.S. carries out extensive research on nearly every aspect of education; provides legislative consultation to local, State, and Federal government; assists affiliates and individual members with organizational, curricular, and instructional problems; directs a program of leadership training; and provides special economic services, including legal and defense assistance. The association is the largest professional organization in the world.

In 1972-73 its membership numbered approximately 1,244,800, and through affiliation of member associations it represented the interests of more than 2,000,000 teachers. Its financial support derives mainly from membership dues. The association maintains ten regional field offices throughout the country; the headquarters is in Washington, D.C.

NATIONAL ENDOWMENT FOR THE ARTS AND THE HUMANITIES. See NATIONAL FOUNDATION ON THE ARTS AND THE HUMANITIES.

NATIONAL FOOTBALL FOUNDATION AND HALL

NATIONAL FOOTBALL FOUNDATION AND HALL OF FAME, THE, organization devoted to serving and promoting the interests of American amateur football, partly by honoring outstanding football players and coaches. It was chartered in 1947 as the National Football Shrine and Hall of Fame and reorganized in 1954 under its present name; in the late 1960's it had 107 local chapters. The ruling body of the foundation is the board of directors, which consists of sixty men drawn from such representative groups as the National Collegiate Athletic Association and the American Football Coaches Association. An executive committee, elected by and from the board of directors, directs the work of the foundation. The honors court, which comprises twelve members, annually chooses new members of the Football Hall of Fame from nominees named by the membership of the foundation and by other qualified observers. To be eligible, a professional football player must have completed his career in the game and must have graduated from college at least ten years before his nomination. A coach becomes eligible three years after completing his career.

Candidates are inducted into the Hall of Fame at an annual awards dinner, held at foundation headquarters in New York City, which also houses the College Football Hall of Fame. Also on this occasion, college-level athletes are honored for excellence in academic studies, football performance, and campus leadership. The leading college football team is awarded the General Douglas MacArthur Bowl. A gold medal is presented annually to a prominent person for outstanding achievement; and from time to time a Distinguished American Award is presented to a person for outstanding service to the country.

NATIONAL FOUNDATION—MARCH OF DIMES, formerly NATIONAL FOUNDATION FOR INFANTILE PARALYSIS, voluntary health organization founded in 1938 by President Franklin Delano Roosevelt (q.v.) to direct and unify the fight against poliomyelitis (q.v.). Public contributions to the March of Dimes, the fund-raising campaigns of the foundation, financed the research leading to the development of the first successful poliomyelitis vaccine by the American virologist Jonas Edward Salk (q.v.), and of the oral vaccine by the American medical researcher Albert Bruce Sabin (q.v.). These vaccines have eradicated the disease as a public-health problem.

In 1958 the organization changed its name to National Foundation, and efforts were concentrated on the problem of birth defects (q.v.),

which strike about 250,000 infants in the United States each year. By 1970 more than 100 centers for diagnosis, treatment, and research in birth defects were established across the nation. The National Foundation—March of Dimes also supports basic research and professional and public education. More than 3000 chapters of the foundation exist throughout the U.S. Headquarters of the organization is in New York City.

NATIONAL FOUNDATION ON THE ARTS AND THE HUMANITIES, independent agency in the Executive Department (q.v.) of the Federal government, established in 1965 to support the humanities and the arts.

The foundation, located in Washington, D.C., is composed of the National Endowment for the Arts and the National Endowment for the Humanities, each with an endowment chairman and an advisory council of twenty-six private citizens appointed by the President; and also of the nine-member Federal Council on the Arts and the Humanities, designed to coordinate programs of the two endowments, and including the two endowment chairmen. The two national endowments provide grants to individuals and non-profit organizations. The National Endowment for the Arts offers grants-in-aid to State arts agencies, in order to encourage growth of arts and humanities in the United States, while increasing public understanding and appreciation of them.

Dr. Jonas Edward Salk, administering the polio vaccine he developed, to a child in Pittsburgh, Pa., during a trial program in 1954.
March of Dimes



NATIONAL FORESTS. See **FOREST:** *United States Forests*; **FOREST SERVICE.**

NATIONAL GALLERY OF ART. See **SMITHSONIAN INSTITUTION:** *National Gallery of Art.*

NATIONAL GEOGRAPHIC SOCIETY, organization of scientists, established in 1888 for the increase and diffusion of geographic knowledge; see **GEOGRAPHY.** The society sponsors many expeditions to all parts of the world, often in cooperation with other organizations engaged in oceanographical, astronomical, cartographical, and natural-history studies. Among the most recent studies and expeditions were those of the British anthropologist Louis S. B. Leakey (q.v.) on early man and manlike creatures in east Africa, and those of Jacques-Yves Cousteau (q.v.), who investigated man's ability to live and work beneath the sea. Another recent study, taken with the cooperation of the National Park Service (q.v.) in Mesa Verde National Park in Arizona, is aimed at preserving cliff dwellings of the ancient Pueblo Indians (q.v.). Two of the most famous historical expeditions undertaken by the society were those of Admiral Robert E. Peary (q.v.) and Admiral Richard Evelyn Byrd (see under **BYRD**) into the polar regions, and the ascent of Mt. Everest (q.v.) in 1963.

The journal, *National Geographic*, is received monthly by some 8,000,000 members; the society also issues maps, books, film strips, daily geographical news features, and a special weekly *School Bulletin* during the school year, and it produces occasional television programs.

Headquarters of the society is in Washington, D.C.

NATIONAL GRANGE, popular name of the **NATIONAL GRANGE OF THE PATRONS OF HUSBANDRY**, fraternal society founded in 1867 at Washington, D.C., by the American agriculturist Oliver Hudson Kelley (1826-1913) and his associates. The Grange was established to advance the social, economic, and political interests of the farmers of the United States. It marked the first stage in the agrarian protest that arose soon after the Civil War and continued until the end of the 19th century; see **GRANGER MOVEMENT**; **GREENBACK PARTY**; **POPULISM.**

Soon after the Grange was formed, State, county, and local granges were organized, with membership open to farmers and their families. By 1874, there were more than 20,000 local granges in 32 States, chiefly in the Middle West and the South. These groups attempted to alleviate the financial difficulties of their members by establishing cooperative stores, purchasing agencies, and factories for the manufacture of farm machinery. By the late 1870's most of these

ventures collapsed because of inefficient management and powerful private competition. Membership declined from about 860,000 in 1875 to about 124,000 in 1880.

Despite the decline, the Grange had succeeded in relieving the isolation of farm life, and in the closing years of the 19th century it focused its energies on such programs. Thereafter, the membership gradually rose, and at the same time a gradual revival of other functions took place, including the establishment of cooperative ventures for the purchase and sale of commodities needed by farmers. The Grange also initiated a system of fire, windstorm, and automobile insurance.

Today the Grange is not only active in these fields but also exerts its influence to secure the passage of legislation aimed at improving the economic conditions of rural America. In 1972 the total membership of the Grange was about 600,000; nearly 6000 local granges and 1500 junior granges were active in 41 States.

NATIONAL GUARD OF THE UNITED STATES, volunteer military organization composed of the Army National Guard and the Air National Guard. In time of peace guard units are under the jurisdiction of State governors and may be mobilized during natural disaster or civil disorder; they are also reserve components of the United States Army and the United States Air Force (qq.v.). As such, the units may be ordered to active Federal duty by the President in time of war, or to "execute the laws of the Union", or in such times of emergency as may be authorized by the United States Congress.

National Guard units are located in each of the fifty States, the District of Columbia, Virgin Islands, and Puerto Rico. Pay for guardsmen and funds for equipment are included in the budget of the Department of Defense (q.v.). Guardsmen undergo basic and advanced individual training with enlistees in the regular services. Guardsmen then return to their home units, where they attend forty-eight training assemblies per year and train in the field for fifteen days each year. Additional training assemblies may be authorized to prepare a unit for possible State or Federal duty.

National Guard officers, commissioned by their respective States, must meet regular service standards for commissioning and promotion, and they hold reserve commissions in the U.S. Army or Air Force.

In the Department of Defense, the National Guard is represented by the chief of the National Guard Bureau, a major general in either the Army Guard or Air Guard, who reports to

NATIONAL GUARD OF THE UNITED STATES

the secretaries of the Army and Air Force.

Army National Guard. As reorganized in 1968 the Army National Guard, sometimes called the Army Guard, comprised 5 infantry, one mechanized infantry, and 2 armored divisions, 18 separate brigades, 4 armored cavalry regiments, 292 separate battalions, and smaller combat support and service units. The approximate authorized strength is 400,000.

Air National Guard. The Air National Guard, sometimes called the Air Guard, was organized in 1946; it normally includes the following units: tactical fighter, tactical reconnaissance, tactical airlift, air refueling, military airlift, tactical electronic-warfare, and fighter interceptor. Ground units that support flight operations engage in communications, installation of ground-electronic equipment, aircraft control and warning, weather, medical, and airbase operations. In peacetime, the Air Guard operates approximately 1700 aircraft and its authorized strength is more than 104,000.

Civil Disturbances. With the outbreak of civil riots in Newark, N.J., and Detroit, Mich., in July, 1967, about 15,000 guardsmen were called up to aid police in the two cities. During the following twelve months 104,665 National Guard troops were mobilized in 77 instances of either threatened or actual civil disturbances. During the fiscal year ending June 30, 1973, only 8321 guardsmen were utilized, compared with 7353 and 16,868 in the previous two fiscal years. Nevertheless, intensive training programs and continuance of close working relationships between civilian law-enforcement and State military officials have been maintained to insure the capability for appropriate command and control of civil-disturbance operations.

History. The National Guard originated in colonial times as local "trained bands" organized to protect settlers from hostile Indians and other threats. The longest continuity in the guard is found in the 101st Engineer Battalion of the Massachusetts National Guard, founded in Boston as the North Regiment in 1636. In 1775, the Second Continental Congress (see CONTINENTAL CONGRESS) made the militia of the various colonies the nucleus of the Continental army. At the peak of hostilities almost half the army consisted of militiamen. The founding fathers provided for the perpetuation of the guard in Article I of the Constitution of the United States.

Congress began to extend financial support to State militia in 1808. In 1824 the Seventh Regiment of New York State militia styled itself "National Guard", in honor of the French general the Marquis de Lafayette (q.v.), who comman-

ded the Garde Nationale of France. By 1900 the designation had been adopted by most of the States. Militia units made major contributions in every conflict in which the U.S. has been engaged, from the American Revolution to the war in Vietnam. Largely as a result of insufficient Federal supervision, however, the State units lacked the prerequisites of a Regular Army reserve. Legislation designed to overcome the shortcomings was enacted in 1903. Federal aid to the guard increased steadily thereafter.

During the Mexican-American border crisis of 1916, about 170,000 guardsmen were Federalized, and in the same year the first National Guard aviation unit was organized. During World War I (q.v.) 16 guard divisions comprising about 433,000 men were mobilized; 11 of these divisions took part in combat operations.

Following the war the U.S. Army was reorganized, and under congressional legislation of 1920 the National Guard became, along with the Regular Army and the Organized Reserve Corps, one of the basic components of the U.S. Army. The importance of the guard in the Federal defense system was further recognized in 1933, when Congress passed the bill establishing the National Guard of the United States. In this bill Congress granted the Federal government direct authority to summon the guard to duty, abrogating the traditional procedure whereby Federalization of guard units required prior approval by the governors concerned.

On Sept. 16, 1940, fifteen months prior to American engagement in World War II, the guard was called into Federal service. Guard personnel then numbered about 300,000 men in 18 divisions and smaller units. During the war 9 divisions served in the Pacific theater of operations and 9 in the European theater.

For a brief period following World War II the guard was disbanded and nonexistent, but in October, 1945, it was reestablished on the basis of 27 divisions and 514 air units.

On July 31, 1950, after the start of the Korean War, President Harry S. Truman (qq.v.) Federalized 4 guard divisions and 2 guard regimental combat teams. Four more divisions and other units, including 12 Air Guard wings, were later called into Federal service. Two of the divisions fought in Korea and 2 served with the North Atlantic Treaty Organization (q.v.) in Europe.

In 1961-62, in response to the Communist threat against West Berlin manifested in the building of the Berlin Wall, 2 Army Guard divisions and 104 smaller units, totaling 45,118 men, were mobilized, as well as 9 Air Guard wings and three F-104 squadrons, totaling 21,460 men.

In 1968 the need for troops to fight in Vietnam (see VIETNAM, WAR IN) was intensified by the threat of conflict with North Korea (see KOREA: History), which seized the U.S. intelligence ship *Pueblo* on Jan. 23. Three days later 9178 members of the Air Guard were mobilized. On May 13 an additional 1333 Air Guardsmen were called to active duty along with 12,234 Army guardsmen. Nearly all of the mobilized guardsmen served in Vietnam, and all were returned to State control by Dec. 31, 1969.

COLONEL BRUCE JACOBS,
CHIEF, OFFICE OF PUBLIC AFFAIRS
NATIONAL GUARD BUREAU

NATIONAL HEALTH INSURANCE, government-operated system of insurance which provides financial benefits and medical services to persons disabled by sickness or accident. National health-insurance systems are found in many countries, particularly in Europe. In the United States, health insurance has traditionally been provided by private enterprise on a voluntary basis. National health-insurance bills were introduced in the United States Congress in the 1930's and 1940's but were not enacted. The Social Security Amendments of 1965, however, created a governmental health-insurance program known as Medicare, which is intended primarily for the aged; see HEALTH INSURANCE; MEDICARE AND MEDICAID.

Systems of national health insurance frequently are coordinated with other national programs of social insurance, such as pension programs, programs of unemployment insurance, and workmen's compensation (q.v.).

The first country to provide health insurance on a national scale was Germany. The German chancellor Prince Otto von Bismarck (q.v.) obtained passage of a compulsory sickness-insurance law in 1883, which was financed by a state subsidy. Various types of national health insurance were adopted by other European countries, including Austria-Hungary later in the 19th century, Norway in 1909, Sweden in 1910, and Great Britain and Russia in 1911. After World War II the growth of national systems of health insurance in Europe was extensive, though the amount of benefits, conditions of eligibility, treatment of dependents, and provisions for maternity care varied widely.

Great Britain. The British system of national health insurance, known as the National Health Service, was thoroughly reorganized after World War II, and is one of the most comprehensive systems in operation. The system is at present under the jurisdiction of the Department of Health and Social Security, which administers

the payment of cash benefits for sickness and maternity. All employed and self-employed persons between the ages of fifteen and sixty-five are eligible for benefits, and the funds for the program are derived from weekly contributions by employers and employees. Sickness benefits are payable up to pensionable age if 156 weekly contributions have been made. Maternity benefits include weekly allowances, before and after confinement, to women who ordinarily work, and also cash grants for each child and home-confinement grants.

The National Health Service administers the National Health Service Act, which went into effect in 1948. The cost of the program is met largely from public funds. Benefits, of unlimited duration, include hospital services, general medical services outside of hospitals, and local health services. Hospital services are provided in general and special hospitals, for inpatient, outpatient, and day-patient care, including the services of specialists. General medical services include those of general practitioners and dental, pharmaceutical, and ophthalmic services. The local health services include maternity and child-welfare services, domiciliary nursing care, aftercare, immunization, and some mental-health services.

A person may use all the facilities of the National Health Service, or only a part of the service. He may, for example, make private arrangements with a practitioner for medical care and apply for free hospitalization. Practitioners are not required to participate in the program. Those who participate and work outside of hospitals receive a fee for each patient as well as a basic practice allowance, and are restricted to a maximum of 3500 National Health Service patients. Participating physicians may engage also in private practice. In the early 1970's, about 23,200 physicians were participating in the program. Nearly all of the 2810 hospitals in Great Britain are under the National Health Service.

A.Tr.

NATIONAL INCOME, in the theory of economics (q.v.), the total net income earned by the people of a country in producing the national output of goods and services over a period of time, usually a calendar year.

National income figures are taken from the basic income figure called gross national product (q.v.), and are the result of certain reductions and additions from that figure. Economists generally approach income figures from either of two standpoints. In one approach income comprises the total annual sum paid to factors of production: rent for land, wages for labor,

NATIONAL INCOME

interest on capital, and profits for management. In the second approach national income is the total net money value of the national output of goods and services.

A statistical concern is the computation of value. The difficulty arises because the value of a complete product includes the value of its component parts. Care is therefore taken to avoid duplication and to include only the value of the complete product; see **VALUE**.

Also excluded from the national income figure is the value of transactions that do not represent payments to factors of production, or do not add value to national output, such as inheritances, gifts, or capital gains on assets.

National-income statistics may be taken as an index of the prosperity of a country if the prices used to evaluate income and output provide a reasonable indication of the economic welfare of the country and of changes in the price and quality of goods. The statistics on national income collected by the Department of Commerce for the United States are shown in the following table; see **COMMERCE, DEPARTMENT OF**.

NATIONAL INCOME

Year	Total ¹	Year	Total ¹
1929	86.8	1957	366.1
1933	40.3	1959	400.0
1937	73.7	1963	481.9
1939	72.6	1967	653.6
1943	170.3	1969	766.0
1947	199.0	1971	857.7
1949	217.5	1973	1,065.6
1953	304.7	1974	1,142.8 ²

¹ In billions of dollars

² Preliminary

In comparing the national-income totals of various years, consideration must be given to the purchasing power of the dollar values represented by those figures, or, as it is called, real national income. Thus, the decline in the national income from 1929 to 1933 amounted to more than 50 percent. When considered in terms of the increase of the purchasing power of the dollar, in 1933, resulting from the decline in prices, however, the real national income decreased only by about 40 percent. The great rise in national income after 1939 was offset to an important degree by a reduction in the purchasing power of the dollar as a result of inflation; see **INFLATION AND DEFLATION**.

Personal Income. Derived from national income figures, personal income is the amount of money received by individuals for their own use. It is made up of all types of income: wages and salaries, proprietor and rental income, dividends and personal interest income, and transfer payments. The latter comprises income from

pensions, social insurance, and social-service payments. In recent years transfer payments have become a more important segment of personal income. When total taxes are subtracted from personal income, the remainder is called disposable income, which is either spent or saved. Through the measurement of these income figures, the government determines how much money is available as income and how it is dispersed. Another measurement is per capita income, the average amount accruing to each member of the population. In 1974 U.S. per capita income was \$4623.

PERSONAL INCOME 1974

United States ¹	\$1,150.5		
Wages and salary	\$751.2	Disposable income	\$979.7
Proprietor income	93.0	Personal interest	103.8
Rental income	26.5	Transfer payments	139.8
Dividends	32.7	Other	3.5

¹ In billions of dollars

D.M.J. & J.T.M.

NATIONAL INDUSTRIAL RECOVERY ACT,

Federal law enacted in June, 1933, comprising one of the major enactments of the New Deal (q.v.) administration of President Franklin Delano Roosevelt (q.v.). The basic aim of the act was to alleviate the severe economic depression that had been precipitated by the crisis of 1929, and that by 1933 had caused a sharp decline in industrial production and commercial activity, and a consequent rise in unemployment (q.v.). The act empowered the President to formulate a program in which private industry would voluntarily cooperate with the Federal government in the establishment of industrial codes providing for the shortening of hours of labor, the setting of minimum wages, and the mitigation of the intense price competition that had resulted from the shrinkage of the market. In addition, the President was authorized to carry out an extensive program of public-works projects.

Immediately after the passage of the act, the President established the National Recovery Administration (N.R.A.) as an independent agency of the Federal government charged with directing the program of industrial recovery. Brigadier General Hugh Samuel Johnson (q.v.) was appointed to administer the N.R.A. Under Johnson's direction, codes were set up for about 98 percent of American industry during the ensuing eighteen months. As a result, substantial gains were made in industrial production, and unemployment was curtailed.

On the other hand, the N.R.A. codes also gave rise to cartels and to conflicts of interest that proved difficult to resolve. The codes did not succeed in eliminating unfair competition and

had an adverse effect on the competitive ideal traditional to the U.S. free-enterprise system. See **MONOPOLY AND COMPETITION**: *Types of Monopolies*; *Public Regulation*.

In May, 1935, the Supreme Court of the United States declared the code-making provisions of the act unconstitutional, asserting that Congress could not legally delegate its legislative authority and that Federal regulation of intrastate commerce as provided in the industrial codes was illegal. The practical effect of this decision was to invalidate the entire law; soon afterward the N.R.A. was liquidated. The law, however, did help establish the forty-hour, five-day, workweek, which was later incorporated in labor legislation; see **FAIR LABOR STANDARDS ACT**.

See also **HOURS OF LABOR**; **WAGES**.

NATIONAL INSTITUTE OF ARTS AND LETTERS, society of artists, writers, and composers, founded by the American Social Science Association in 1898 for the purpose of furthering literature and the fine arts in the United States. The institute has three departments: art, literature, and music; and membership is limited to 250 American citizens. In 1904 the American Academy of Arts and Letters (q.v.) was created as a section of the institute. In order to establish cultural ties with other countries, the institute and the academy elect noted foreign artists, writers, and composers as honorary members. Various exhibitions of works of art, books, and manuscripts are held during the year, as well as an annual ceremonial at which new members are inducted and awards and honors are conferred. Publications include the *Yearbook*, *Proceedings*, and catalogs of exhibitions. The institute is privately endowed and maintains headquarters in New York City.

NATIONAL INSTITUTES OF HEALTH (N.I.H.), agency of the United States Department of Health, Education, and Welfare, established in 1930; see **HEALTH, EDUCATION, AND WELFARE, DEPARTMENT OF**. Part of the Public Health Service (q.v.), the N.I.H. seeks to improve the health of the American people. It supports and conducts biomedical research into the causes and prevention of diseases and uses a modern communications system to furnish biomedical information to the medical and health professions.

The N.I.H. currently consists of ten research institutes, four divisions, and the National Library of Medicine. In addition, it operates the Clinical Center, a 516-bed research hospital, and the Fogarty International Center, both in Bethesda, Md.

In 1972 the N.I.H. had about 12,300 employees, one third of whom were professional and

scientific personnel. At any given time, some 14,000 research projects are under way in N.I.H. laboratories and clinics.

For fiscal year 1972, the total appropriation of the N.I.H. was \$2,185,556,000. Of this amount, \$546,737,000 was allotted to direct operations. The remainder, \$1,638,819,000, supported grants and contracts for research, fellowships, training, health research facilities and community mental health centers construction, State control programs, community demonstration projects, and student loans and scholarships.

NATIONALISM, in modern history, movement in which the nation-state is regarded as paramount for the realization of social, economic, and cultural aspirations of a people. Nationalism is characterized principally by a feeling of community among a people, based upon common descent, language, and religion. Before the 18th century, when nationalism emerged as a distinctive movement, states usually were based on religious or dynastic ties; the citizen owed loyalty to his church or ruling family. His interests, concerned with clan, tribe, village, or province, rarely extended nationwide.

Historically, the tendency toward nationalism was fostered by various technological, cultural, political, and economic advances. Improvement in communications extended the knowledge of people beyond their village or province. The spread of education in vernacular tongues to the lower-income groups gave them the feeling of participation in a common cultural heritage. Through education, people learned of their common background and tradition and began to identify themselves with the historical continuity of the nation. The introduction of national constitutions and the struggle for political rights gave peoples the sense of helping to determine their fate as a nation and of sharing responsibility for the future well-being of that nation. At the same time the growth of trade and industry laid the basis for economic units larger than the traditional cities or provinces.

Most modern nations have developed gradually on the basis of common ties of descent, religion, and language. Several exceptions exist, however, notably Switzerland, the United States, Israel, and India. Switzerland is a nation in which no common religion or language was ever established. The Swiss number many adherents to both the Catholic and Protestant religions; moreover they have no linguistic unity, for German, French, and Italian are spoken in distinct regions of the country. Swiss nationalism was fostered primarily by isolation in a mountain region, the determination to maintain

NATIONALISM

political independence, and rivalry among imperial powers, which kept each from aggression against Switzerland.

The U.S. is a nation formed largely by British immigrants with disparate religious ties, and developed to a great extent by other immigrants having little in common except a yearning for religious, economic, and political freedom. Although the American nation is unilingual, American nationalism was based primarily upon a dedication to the concept of individual liberty and representative government derived from British traditions. What was considered in Great Britain the birthright of Britons became in the U.S., under the influence of the Enlightenment (q.v.) of the 18th century, the natural right of every man. The Declaration of Independence (q.v.) marked the consummation of this libertarian ethos.

Israel is a nation formed almost entirely from the immigration of diverse national groups of Jews who shared a common ideal based upon religious nationalism. The traditional aspirations of Jews for a national revival in Palestine had remained unfulfilled for almost two thousand years. As a result of genocide (q.v.) perpetrated by the National Socialist rulers of Germany before and during World War II, Jewish national

aspirations suddenly achieved dynamic force; see NATIONAL SOCIALISM. More than a million refugees from many different countries emigrated to Palestine. They learned Hebrew, the recreated national language, and established a new state with Judaism as the state religion. Among world Jewry, however, the Jews of Israel are a minority; most Jews continue to live as minority religious groups in their fatherlands.

India is a nation in which the Hindu religion served as the cohesive traditional element in uniting peoples of various races, religions, and languages. India achieved national unity through the influence of Western ideas, notably those of British origin, and in struggle against British rule.

HISTORY.

The beginnings of modern nationalism may be traced back to the disintegration, at the end of the Middle Ages, of the social order in Europe and of the cultural unity of the various European states. The cultural life of Europe was based upon a common inheritance of ideas and attitudes transmitted in the West through the Latin language, the language of the educated classes. All Western Europeans adhered to a common religion, Catholic Christianity. The breakup of feudalism (q.v.), the prevailing social and economic system, was accompanied by the development of larger communities, wider social interrelations, and dynasties which fostered

Berlin nationalists declaring the Palace of the Prince of Prussia to be national property, an incident during the Revolution of 1848.

Bettmann Archive



feelings of nationality in order to win support for their rule. National feeling was strengthened in various countries during the Reformation (q.v.), when the adoption of either Catholicism or Protestantism as a national religion became an added force for national cohesion.

THE FRENCH REVOLUTION. The great turning point in the history of nationalism in Europe was the French Revolution (q.v.). National feeling in France until then had centered in the king. As a result of the revolution, loyalty to the king was replaced by loyalty to the *patrie*, or fatherland. Thus "The Marseillaise", the anthem of the French Revolution which later became the national anthem, began with the words *Allons enfants de la patrie* ("March on, children of the fatherland"). When in 1789 the medieval French Estates General, consisting of separate bodies representing the clergy, the aristocracy, and the common people, was transformed into a National Assembly, France achieved a truly representative system of government. Regional divisions, with their separate traditions and rights, were abolished, and France became a uniform and united national territory, with common laws and institutions. French armies spread the new spirit of nationalism in other lands.

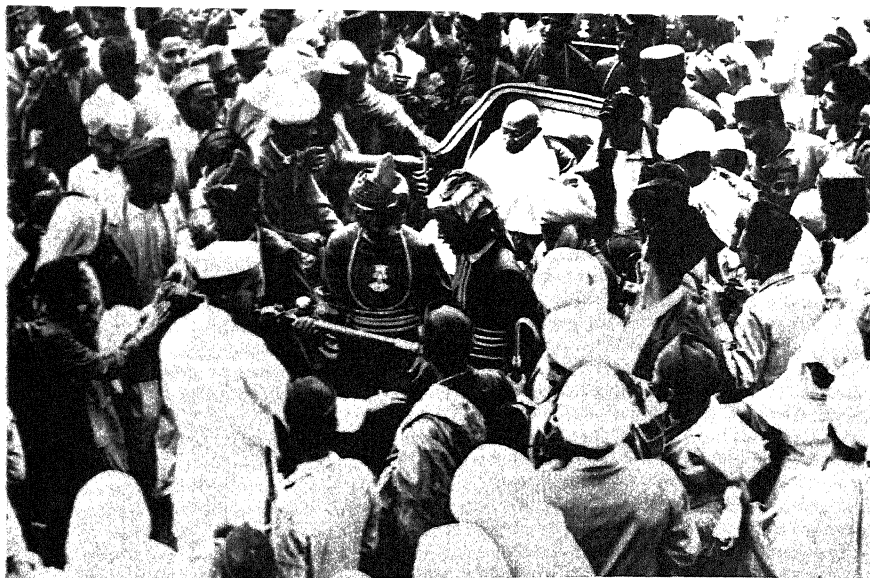
The rise of nationalism coincided generally with the spread of the industrial revolution (q.v.), which promoted national economic development, the growth of a middle class, and popular demands for representative government. National literatures arose to express common traditions and the common spirit of each people. New emphasis was given to nationalist symbols of all kinds, for example, new holidays were introduced to commemorate events in national history.

Revolution of 1848. The Revolution of 1848 in central Europe marked the awakening of various peoples to national consciousness. In that year both the Germans and the Italians originated their movements for unification and for the creation of nation-states. Although the attempts at revolution failed in 1848, the movements gathered strength in subsequent years. After much political agitation and several wars, an Italian kingdom was created in 1861 and a German empire in 1871. Other central European peoples who agitated for national independence in 1848 include the Poles, whose territory was divided among Russia, Germany, and Austria; the Czechs and the Hungarians, subjects of the Austrian monarchy; and the Christian peoples living in the Balkan peninsula under the rule of the Turkish sultan. The events in Europe between 1878 and 1918 were shaped largely by the na-

tionalist aspirations of these peoples and their desire to form nation-states independent of the empires of which they had been part. *See* REVOLUTION OF 1848.

World War I. The war fulfilled the national aspirations of the central European peoples. When the U.S. entered the war under the leadership of President Woodrow Wilson (q.v.), he proclaimed the principle of national self-determination as one of the major issues of the conflict. As a result of the war, the rule of the dynasties in Turkey, Russia, Austria, and Germany was ended, and in central and eastern Europe a number of new nation-states arose, notably Finland, Estonia, Latvia, Lithuania, Poland, Czechoslovakia, and Hungary. Others such as Yugoslavia and Rumania were greatly enlarged. Nevertheless, nationalist problems continued to disturb central and eastern Europe. Many of the new nation-states contained national minorities which demanded independence or changes in frontiers. The conflicting claims of German and Polish nationalism became the immediate cause of the outbreak of World War II. The inflammation of nationalist passions during and after World War I led also to the rise of fascism (q.v.) and National Socialism. Fascism in Italy and National Socialism in Germany adopted the totalitarian system introduced earlier in the Soviet Union with communism (q.v.). This system served as a means of destroying opposition and of integrating all the resources of the nation for the realization of a program of national aggrandizement. Because such a program conflicted with the vital interests and even the survival of other nations, a general war in Europe became inevitable. The Soviet Union, although it had been established by means of a movement proclaiming international ideals, resorted to national aggrandizement in the 1940's. The anthem of international communism, "The Internationale", was replaced by a new Soviet national anthem, and the U.S.S.R. sought to make the communist parties of all nations serve the Soviet national interests.

Another far-reaching effect of World War I was the rise of nationalism in Asia and Africa under the impact of Western ideas and industrialism. Asian nationalism was inspired, also, by the example of Japan, the first Far Eastern country to assume on its own initiative the form of a modern nation and to win, in 1905, a war against a Western power, the Russo-Japanese War (q.v.). After World War I the Turks, under the national leader Kemal Atatürk (q.v.), defeated (1922-23) the Western allies and modernized their state in a spirit of nationalism after the Eu-



The Indian nationalist Mohandas Gandhi drawn in a carriage through an admiring throng in 1940. UPI

ropean model. During the same period the leader of the Indian National Congress, Mohandas Karamchand Gandhi (q.v.), deeply stirred the aspirations of the Indian masses for national independence. In China the leader of the Kuomintang, or Nationalist People's Party, Sun Yat-sen (q.v.), inspired a successful national revolution. Because all these movements were directed against the Western European powers, they were supported by Soviet communism.

World War II. The penetration of nationalism into colonial countries was hastened by the conflict. The British, French, and Dutch empires in eastern Asia were overrun by the Japanese, who widely disseminated the nationalistic slogan "Asia for the Asians". The colonial powers were weakened further by the military and economic consequences of the war and by the expansion of Soviet power. In its propaganda, the Soviet Union emphasized mainly the right of the colonial countries to national self-determination and independence. Great Britain, influenced by the liberal tradition in politics, willingly granted independence to India, Pakistan, Ceylon, Burma, Malaya (now part of Malaysia), and Gold Coast (now Ghana). Similarly the U.S. granted independence to the Philippines. The Netherlands relinquished control of the Dutch East Indies, which became the Republic of Indonesia. France lost possession of its colonial empire in Indochina (q.v.). By 1957 nationalism had asserted itself throughout Asia, and the colonial

empires there, with the exception of that of the Soviet Union, ceased to exist.

In the postwar period nationalist movements developed and won many successes, particularly in Africa and in the Middle East. By 1958 newly established nation-states in those regions included Israel, Morocco, Tunisia, Libya, the Sudan, Ghana, the United Arab Republic (Egypt and Syria), and Iraq. In the 1960's the Algerians, Libyans, and almost twenty formerly British, French, or Belgian colonies in black Africa became independent. The Arab world, covering the immense, strategically important, and oil-rich territory from the Atlantic Ocean to the Persian Gulf, became a hot-bed of nationalism as a result of the creation of the State of Israel in formerly Arab Palestine. Nationalism today, after two centuries, has become worldwide in extent. In modern times it has proved to be one of the most powerful motives for political action.

See also articles on the various nations mentioned. H.K.

NATIONALITY, in law, condition or status of belonging to, or having legal identity with, a nation or state. In various political systems a distinction is made between nationality and citizenship; the latter represents a higher political status, usually involving rights to full participation in governmental affairs. Nationals were classed as citizens and noncitizens in ancient Greece and Rome, with citizens often forming a minority of the population; and this distinction still prevails in some countries. Although the

term national is not used in the Constitution of the United States (q.v.), the laws of the U.S. recognize as nationals of the U.S. all citizens, and certain groups of noncitizens who owe permanent allegiance to the U.S. The latter group includes persons born in an outlying possession of the U.S., such as American Samoa.

See CITIZEN; NATURALIZATION.

NATIONALIZATION, in broad economic terms, the governmental appropriation of property (q.v.) other than land, thereby transferring it from the domain of private property to that of national control. More specifically, the term designates the assumption by a nation of the ownership of privately owned industry, distributive enterprises, or other businesses or services. When applied as part of socialist or communist programs for abolition of private property, nationalization of industry is sometimes known as socialization. Following a severe change in government, such as a revolution (q.v.), nationalization may be effected by expropriation without compensation to the owners of the property, as in Soviet Russia in 1917–18 and in Cuba in 1959. In more moderate, gradual governmental evolution, property appropriation may be effected by some form of indemnification to the owners, as in Great Britain after the installation of the Labour Party government in 1945. Denationalization also occurred as in the case of Britain's steel industry. See CUBA: *History: Cuba Under Castro*; GREAT BRITAIN: *History: The Postwar Era*; UNION OF SOVIET SOCIALIST REPUBLICS: *History*.

Although some degree of government ownership of national resources, industry, transportation, communications, or services essential to social welfare has been a feature of every form of organized society, the subject of nationalization, prior to the latter part of the 19th century, remained the concern primarily of social reformers. The 17th-century English reformer Peter Chamberlen, for example, held that poverty (q.v.) could be eliminated by the nationalization of royal and church estates (see ESTATE), the commons or parks, forests, mines, and other assets of land and sea; he advocated the confiscation of what he characterized as unearned increments in manufacturing, trade, and agriculture. During the French Revolution (q.v.), the French socialist leader François Noël Babeuf (q.v.) advocated the immediate nationalization of all corporations, and of the property of individuals following their deaths.

The first government to initiate a complete nationalization of industry was that of the Soviet Union under the Bolshevik leader Vladimir

Ilich Lenin (q.v.). With respect to other governments, nationalization was used by formerly colonial and semicolonial countries to secure their natural resources against exploitation by foreign capitalist interests; a typical example was the nationalization by the Mexican government in the 1920's and 1930's of the country's various mines and, to safeguard Mexico's vast oil deposits, of the subsoil; see MEXICO: *History: The Revolution*.

Periodically, reform movements in the United States have advocated specific nationalization. In the late 19th century, the People's Party (q.v.) proposed to break the monopolistic control of freight rates by the railroads through "national ownership of . . . transportation".

Recent examples include in the Middle East, the expropriation of the Suez Canal by Egypt (qq.v.) in 1956. During the early 1970's many of the foreign-owned oil interests in the Middle East were either partially or totally nationalized in a concerted move by the Arab states to gain control over their leading, and sometimes only, international commodity. In Latin America utilities and oil and mining operations have been nationalized in Bolivia, Chile, Mexico, and Peru. When nationalization does not work out favorably, some countries may follow Chile's example and denationalize certain properties. Fishing off the coast of Ecuador, Peru, and Mexico was virtually nationalized by expanding the offshore boundaries; see TERRITORIAL WATERS.

See also CAPITALISM; COMMUNISM; EMINENT DOMAIN; MONOPOLY AND COMPETITION; RAILROADS, GOVERNMENT REGULATION OF; SOCIALISM. C.J.F. **NATIONAL JEWISH WELFARE BOARD**, national coordinating agency for Jewish Community Centers (q.v.) and the Young Men's and Young Women's Hebrew Associations (Y.M.-Y.W.H.A.'s) since 1921, when it merged with the National Council of Young Men's Hebrew and Kindred Associations (founded in 1913). The National Jewish Welfare Board was established in 1917 to meet the religious and welfare needs of Jewish military personnel, their dependents, and hospitalized veterans. It is a member of the World Federation of Y.M.H.A.'s and Jewish Community Centers and United Service Organizations, Inc. (q.v.).

In addition to its religious, cultural, and social services to Jewish military personnel, the board coordinates the work of more than 450 Jewish Community Centers and Y.M.-Y.W.H.A.'s, branches, and camps, which serve more than 1,000,000 American Jews. The board has also helped to stimulate greater interest in the Jewish cultural heritage through such services as its

NATIONAL LABOR RELATIONS ACT

lecture bureau that arranges for Jewish lecturers and performing artists to appear in Jewish communities. The bureau also arranges the showing of full-length feature films, most of which deal with Israel. An exchange program with Israel brings Israelis to the United States to work in Jewish Community Centers and camps; American Jewish Community Center and camp workers are, in turn, sent to Israel. Headquarters of the National Jewish Welfare Board are located in New York City.

NATIONAL LABOR RELATIONS ACT, Federal law enacted by the United States Congress in July, 1935, and generally known as the Wagner Act, after Senator Robert Ferdinand Wagner (q.v.) of New York, who introduced it in the Senate. The law, commonly referred to by its abbreviation (N.L.R.A.), governs the labor-management relations of business firms engaged in interstate commerce.

Provisions of the Act. The general objective of the act was to guarantee to employees "the right to self-organization, to form, join, or assist labor organizations, to bargain collectively through representatives of their own choosing, and to engage in concerted activities for the purpose of collective bargaining or other mutual aid and protection". To safeguard these rights and to assure the orderly exercise of them, the act created a National Labor Relations Board (q.v.), known as N.L.R.B., which, among other powers, has the authority to prevent employers from engaging in certain specified unfair labor practices. Among the practices that the statute classified as unfair if engaged in by employers are acts of interference, restraint, or coercion upon employees with respect to their right to organize and bargain collectively; domination of or interference with the formation or administration of any labor organization, or the contribution of financial or other support thereto; discrimination in regard to hiring or dismissal of employees or to any term or condition of employment, in order to encourage or discourage membership in any labor organization; discrimination against any employee because he files charges or gives testimony under the provisions of the act; and refusal to bargain collectively with the representative chosen by a majority of employees in a bargaining unit deemed appropriate by the N.L.R.B.

History After Passage. Prior to the enactment of the N.L.R.A., the Federal government had refrained almost entirely from supporting collective bargaining over wages and working conditions and from facilitating the growth of trade unions; see TRADE UNIONS IN THE UNITED STATES.

The new law, which was proposed and enacted with the firm support of President Franklin Delano Roosevelt (q.v.), marked a significant reversal of this attitude. First the American Federation of Labor and later the Congress of Industrial Organizations (see AMERICAN FEDERATION OF LABOR AND CONGRESS OF INDUSTRIAL ORGANIZATIONS) took advantage of governmental encouragement by carrying out nationwide organizational campaigns. Largely as a result of such efforts, the number of organized workers rose from about 3,500,000 in 1935 to about 15,000,000 in 1947.

TAFT-HARTLEY ACT. In the latter year, however, the attitude of the government and particularly of the Congress, then dominated by a Republican majority, underwent another change and sought to curb the power of organized labor. The change was indicated by the passage of the Labor-Management Relations Act of 1947, introduced in the Senate by Robert Alphonso Taft (q.v.) of Ohio and in the House by Fred Allan Hartley (1902-70) of New Jersey, and therefore known as the Taft-Hartley Act. This law embodied a series of amendments to the National Labor Relations Act. It excluded supervisory employees from the benefits and protection of the N.L.R.A. and prohibited the States from extending such benefits to supervisory employees. It emphasized the right of all employees *not* to join a union and *not* to participate in collective action. It forbade the negotiation of any closed-shop agreement (q.v.) between employers and employees and permitted a union-shop agreement (q.v.) of a limited type only if authorized by State law and voted upon by a majority of the employees in a secret-ballot election. When an employer or his employees desire to terminate or modify an existing collective-bargaining agreement, the act required that due notice of such intent be given, and a waiting-period of specified length be observed. It permitted employers as well as employees to petition the National Labor Relations Board for the holding of elections to determine the collective-bargaining representative of the employees. It required labor unions desiring to use the facilities of the N.L.R.B. to file certain organizational and financial data with the N.L.R.B., and it required the officers of such unions to file affidavits certifying that they are not members of the Communist Party. It enumerated a group of unfair labor practices and empowered the N.L.R.B. to secure injunctions restraining labor unions from the performance of such practices. And it enlarged the National Labor Relations Board from the original three to five members.

Among the practices engaged in by labor unions that the act classified as unfair either to employers or to employees are the use of restraint or coercion exercised upon employees in the exercise of their rights to organize and bargain collectively or to refrain from any or all such activities, and upon an employer in the choice of his bargaining representative; causing or attempting to cause an employer to discriminate against an employee because of his membership or lack of membership in a labor union except under a duly authorized union-shop agreement; refusal on the part of a labor union representing any group of employees to bargain collectively with their employer; requiring employees covered by a duly authorized union-shop agreement to pay initiation fees that the N.L.R.B. finds excessive or discriminatory; causing or attempting to cause any employer to pay money or other thing of value for services not performed or not to be performed; and engaging in or inducing or encouraging the employees of any employer to engage in a strike or similar action for the purpose of achieving certain specified aims deemed unfair to employers. The Taft-Hartley Act also prohibited the checkoff of union dues without the written consent of employees; contributions by employers to union health and welfare funds that are not under joint labor-management administration; and contributions and expenditures by unions in connection with Federal elections, primaries, and conventions. It provided further that anyone whose business or property is injured by a strike or stoppage for a purpose unlawful under the Taft-Hartley Act may sue for damages in the Federal or State courts.

LABOR OPPOSITION TO TAFT-HARTLEY ACT. The enactment of the Labor-Management Relations Act of 1947 precipitated a fierce controversy between its opponents, who claimed that the act was designed to paralyze and eventually to destroy the labor movement, and its adherents, who contended that the act was essential in order to preserve a proper balance between the powers of labor and those of management. The act did not at all paralyze or destroy the labor movement although some unions claim that Section 14(b) permitting a right-to-work law (q.v.) impeded organization in those States that enacted such legislation.

In 1951 Congress repealed the provision prohibiting any union-shop agreement unless authorized by a majority of the employees in a secret-ballot election. A new provision was substituted allowing such agreements to come into force without approval of the employees,

but giving the employees the right to petition the N.L.R.B. for a secret-ballot election to rescind the power of the union to make a union-shop agreement.

In 1959 amendments to the Taft-Hartley Act banned the secondary boycott, a union agreement not to deal with nonunion shops or handle nonunion goods, and restricted picketing (q.v.). Such picketing was forbidden if a valid collective bargaining agreement was in effect with another union, if an election had been held within the preceding twelve-month period to ascertain union representation, or if after thirty days the union did not file for an election to determine representation. See also **LABOR RELATIONS**.

NATIONAL LABOR RELATIONS BOARD, independent agency of the United States government, created by the National Labor Relations Act of 1935. Its powers, duties, and composition, as set forth in that act, were substantially altered by the amendatory Labor-Management Relations Act of 1947, generally known as the Taft-Hartley Act. For a detailed description of these two enactments, see **NATIONAL LABOR RELATIONS ACT**.

The board, commonly termed the N.L.R.B., consists of five members, who are appointed by the President with the consent of the Senate for terms of five years; the general counsel of the N.L.R.B. is also appointed by the President and serves for a term of four years. The board maintains forty-two regional and subregional offices, under the supervision of the general counsel, in various cities of the U.S. and its possessions.

The board is empowered by the labor-relations acts to prevent certain specified unfair labor practices by employers, labor organizations, and their agents; to decide whether the appropriate unit of employees for collective bargaining shall be the employer unit, craft unit, or plant unit; to conduct secret ballots among employees to choose a bargaining representative; or to determine whether the employees desire an agreement with the employer requiring membership in their labor organization as a condition of continued employment; see **UNION-SHOP AGREEMENT**. In carrying out these aims, the N.L.R.B. may issue orders requiring employers, labor organizations, and their agents to cease and desist from unfair labor practices and to take affirmative action to effectuate the policies of the labor-relations acts, including the reinstatement of employees with or without pay; it may certify the results of elections held by secret ballot among employees, and the names of employee representatives chosen by secret bal-

NATIONAL LEGAL AID AND DEFENDER ASSOCIATION

lot; it may order and conduct hearings and investigations, issue subpoenas, administer oaths, and prescribe rules and regulations designed to carry out provisions of the act; it may petition any U.S. court of appeals for the enforcement of its orders; and it may petition a U.S. district court for an appropriate temporary injunction (q.v.) to prevent the continuation of any unfair labor practice.

Any person or labor organization may file with the N.L.R.B. a charge that an employer, labor organization, or the agents of either has engaged in an unfair labor practice affecting interstate commerce.

Any employee, group of employees, or individual or labor organization acting in their behalf, or any employer who has been requested to recognize any individual or labor organization as the representative of his employees, may petition the N.L.R.B. to investigate and certify a representative of employees for the purpose of collective bargaining. A petition for decertification of a representative previously certified or currently being recognized by an employer may be filed with the N.L.R.B. by any employee, group of employees, or by any individual or labor organization acting on their behalf. These persons and groups may also petition the N.L.R.B. for a secret-ballot election to determine whether or not the employees desire to authorize their representative to negotiate a union-shop agreement.

After investigating and finding merit to charges alleging the commission of unfair labor practices, N.L.R.B. regional offices work with the parties to achieve a voluntary settlement adequate to remedy the alleged violation. Failing that, trials are conducted in public hearings before N.L.R.B. administrative law judges. Upon the evidence produced at the hearing, the judge issues a decision containing findings of fact, conclusions, and a recommended order, which takes effect as an order of the N.L.R.B. unless it is appealed to the board by one or more of the parties within twenty days. In cases involving employee representation decided by an N.L.R.B. regional director, appeal from that action may be taken on limited grounds to the board. Any aggrieved party may obtain a review of an N.L.R.B. order in an unfair labor practice case in a Federal court of appeals.

See also LABOR; TRADE UNIONS IN THE UNITED STATES.

NATIONAL LEGAL AID AND DEFENDER ASSOCIATION. See LEGAL AID SOCIETIES.

NATIONAL MARINE FISHERIES SERVICE, Federal agency that succeeded the Bureau of Com-

mercial Fisheries in 1970; see NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION.

NATIONAL MERIT SCHOLARSHIP CORPORATION, known also as N.M.S.C., nonprofit organization that administers two nationwide college scholarship programs for high-school graduates: the National Merit Scholarship Program, open to all students, and the National Achievement Scholarship Program for outstanding Negro students.

The former, established in 1955 with grants from the Ford Foundation and the Carnegie Corporation of New York (qq.v.), currently awards more than 3000 scholarships in two categories each year. National Merit Scholarships are unrestricted, nonrenewable awards of \$1000 financed by N.M.S.C. funds. Sponsored Merit Scholarships, renewable for up to four years of college study, are underwritten by business and industrial firms, foundations, colleges, unions, trusts, and individuals.

The achievement program for outstanding Negro students was established in 1965 with a grant from the Ford Foundation. Two types of scholarships are also awarded in the achievement program. National Achievement Scholarships are nonrenewable awards of \$1000 financed by N.M.S.C. funds. Sponsored Achievement Scholarships, renewable for up to four years of college study, are financed by business corporations and foundations. More than 350 Achievement Scholarships are awarded in each annual program.

Corporation headquarters is located in Evans-ton, Ill.

NATIONAL MILITARY ESTABLISHMENT. See DEFENSE, DEPARTMENT OF.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, agency of the United States Department of Commerce known as N.O.A.A., created by Presidential Reorganization Plan Number 4 of 1970; see COMMERCE, DEPARTMENT OF. Formation of the administration brought together the functions of the Commerce Department's Environmental Science Services Administration, or E.S.S.A. (including its major elements: the Weather Bureau (see WEATHER SERVICE, NATIONAL) Coast and Geodetic Survey, Environmental Data Service, National Environmental Satellite Center, and Research Laboratories); the Bureau of Commercial Fisheries, Marine Game Fish Research Program, and Marine Minerals Technology Center, all formerly administered by the Department of the Interior; the National Oceanographic Data Center and National Oceanographic Instrumentation Center, which were administered by the

NATIONAL PARK SERVICE

United States Navy; the Coast Guard's National Data Buoy Development Project; the National Sea Grant Program of the National Science Foundation (q.v.); and elements of the Army Corps of Engineers' U.S. Lake Survey.

The present or interim organization of N.O.A.A. includes: the National Ocean Survey, combining the activities of the E.S.S.A. Coast and Geodetic Survey and the U.S. Lake Survey, which prepares charts and surveys and monitors tidal and seismic activity; the National Weather Service provides weather forecasts to the general public; the National Marine Fisheries Service, composed of the Bureau of Commercial Fisheries and Marine Game Fish Research Program, which is concerned with the living resources of the sea as they affect the U.S. economy and diet; the National Environmental Satellite Service, formerly E.S.S.A.'s National Environmental Satellite Center, that operates weather and environmental satellite systems; the Environmental Research Laboratories, formerly E.S.S.A.'s Research Laboratories, that conducts investigations to improve man's understanding of his environment; and the Environmental Data Service, combining the E.S.S.A. Environmental Data Service and the National Oceanographic Data Center, that gathers environmental data and provides administrative support for corresponding world data centers.

The N.O.A.A. has also established staff locations for other new functions. The Office of Sea Grant administers and directs the National Sea Grant Program, that supports marine research by institutions and individuals. Attached to the office of the assistant administrator for environmental systems are the National Oceanographic Instrumentation Center, which is concerned with technological testing and improvement of equipment and systems; the Marine Minerals Technology Center, that develops and assesses marine mining technology; and Data Buoy Project Office, which is developing a national system of automatic ocean buoys for continuous marine environmental data.

NATIONAL PARK SERVICE, bureau of the United States Department of the Interior, created by Congressional enactment in 1916. The basic objective of the bureau is to conserve natural scenery, wildlife, and historic sites and objects and to provide for public enjoyment of these areas in such a manner as will leave them unimpaired. The National Park Service is administered by a director, who is responsible to the secretary of the interior. In order to decentralize the administration of the service, Congress has established six regional offices and an office of

National Capital and Urban Park Affairs in Washington, D.C.

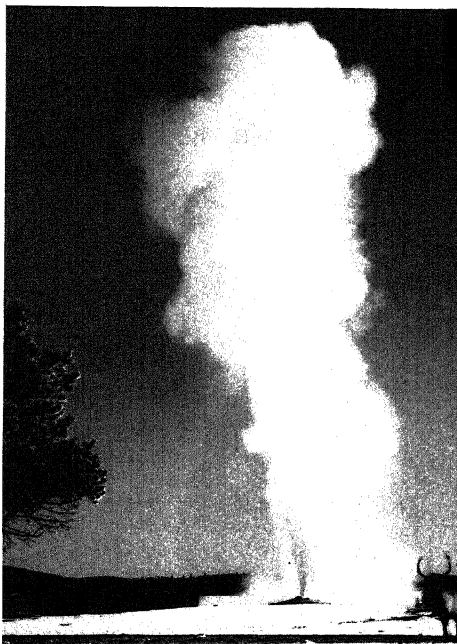
The National Park System comprises three broad categories of areas—natural, historical, and recreational—depending upon their major purposes. The sites are set aside by Congress, which determines also their boundaries. The accompanying table lists the various areas included in the National Park Service. For detailed descriptions of the principal areas, see separate articles; see also NATIONAL CEMETERIES, and *Places of Interest* sections in separate State articles.

The first national park was established in 1872 when Congress set aside a large tract of wilderness in Wyoming, thus creating Yellowstone National Park. Each national park is administered by a superintendent, who supervises the selection and training of the staff, organizes recreational programs, and plans conservation activities. The parks employ naturalists, foresters, landscape architects, engineers, biologists, geologists, historians, guides, and rangers. Hunting is forbidden and fishing is regulated strictly to ensure the preservation of the fish supply. As required at each site supervised by the National Park Service the bureau engages in such activities as fire prevention and control, wildlife conservation, control of water pollution, and pro-

Continued on page 158

Old Faithful, the famous geyser at Yellowstone National Park.

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NATIONAL PARKS

Name	Location	Total Acreage	Established	Outstanding Features
Acadia Maine	Maine	36 860.99 73 388.98	1916 ¹ 1929 ²	Picturesque Mount Desert Island Sandstone formations National monument (1928-71)
Big Bend Bryce Canyon Canyonslands Capitol Reef	Texas Utah Utah Utah	709 488.12 36 010.38 337 559.03 241 865.48	1944 1923 ³ 1964 1937 ⁴	Scenic great bend of Rio Grande R. Colorful unusual rock formations Geologic erosion on Green and Colorado rivers Brightly colored sedimentary rocks dissected by gorges National monument (1937-71)
Carlsbad Caverns Crater Lake Everglades Glacier Grand Canyon	New Mex.co Oregon Florida Montana Arizona	46 765.33 *60 280.33 1 400 533.00 1 013 598.40 1 218 375.00	1923 ⁵ 1902 1947 1910 1908 ⁶	Largest underground chambers yet discovered Deep blue lake in volcanic caldera Subtropical wilderness Scenic mountains glaciers and lakes Spectacular canyon vast geologic time represented by exposed rocks
Grand Teton Great Smoky Mountains	Wyoming North Carolina-Tennessee	310 418.22 517 014.22	1929 ⁷ 1930	Most impressive peaks of Teton Range Highest range E. of Black Hills luxuriant plant life
Guadalupe Mountains	Texas	78 972.42	1986	Portions of the world's most extensive and significant Permian limestone fossil reef tremendous earth fault unusual flora and fauna ⁸
Haleakala	Hawaii	27 823.68	1961 ⁹	Famous 10 023-ft. volcano (dormant) with rare silverswords growing in its crater
Hawaiian Volcanoes Hot Springs Isle Royale Kings Canyon Lassen Volcanic	Hawaii Arkansas Michigan California California	229 177.03 5 764.86 539 279.94 460 122.95 108 372.22	1916 ⁹ 1921 ¹⁰ 1940 1940 ¹¹ 1916 ¹²	Active volcanoes rare plants and animals Forty seven mineral hot springs Forested island wilderness moose Mountain wilderness and canyons sequoia trees Only active volcano in U.S. outside Alaska and Hawaii
Mammoth Cave	Kentucky	51 310.62	1941	Underground passages with limestone, gypsum and cave onyx formations
Mesa Verde Mount McKinley	Colorado Alaska	52 036.24 1 939 482.80	1906 1917	Noted pre-Columbian cliff dwellings Highest North American peak large glaciers of Alaska Range
Mount Rainier North Cascades	Washington Washington	235 404.00 504 785.33	1899 1968	Glaciers on ancient volcanic peak Roadless alpine landscape with jagged peaks mountain lakes and numerous glaciers in two units
Olympic	Washington	897 884.81	1909 ¹³	Mountain wilderness remnant of Pacific Northwest rain forest
Petrified Forest	Arizona	94 189.33	1906 ¹⁴	Extensive natural exhibit of petrified wood; Indian ruins portion of Painted Desert
Redwood	California	62 304.20	1968	World's tallest known tree (367.6 ft.) in virgin stand of coast redwoods, in two units linked by coastal corridor
Rocky Mountain	Colorado	263 791.30	1915	Magnificent section with 107 named peaks over 10 000 ft.
Sequoia	California	388 823.00	1890	Among world's oldest and largest trees, Mt. Whitney highest peak in U.S. outside Alaska
Shenandoah Virgin Islands	Virginia Saint John Island Virgin Islands	190 420.13 14 470.38	1935 1956	Scenic Blue Ridge Mts. with Skyline Drive on crest Green hills sandy beaches, underwater trail tropical plants and animals
Voyageurs Wind Cave	Minnesota South Dakota	219 128.00 28 060.03	1971 1903	Beautiful lakes and forests Limestone caverns in scenic Black Hills wildlife exhibit
Yellowstone	Wyoming-Montana-Idaho	2 219 822.70	1872	World's greatest geyser area scenic falls canyons, wildlife sanctuary
Yosemite	California	761 096.16	1890	Beautiful mountain region, inspiring gorges, granite cliffs, waterfalls
Zion	Utah	146 570.41	1909 ¹⁵	Colorful canyon and mesa scenery

NATIONAL MONUMENTS

Agate Fossil Beds	Nebraska	3 054.43	1965	World-renowned quarries containing Miocene mammal fossils
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* Principal features not Federally owned or administered.

** No Federal facilities that is, usual services and personnel not available

*** Year acquisition of land authorized by Congress; may occur several years before establishment date

¹ Originally established as Sieur de Monts National Monument, 1916 became Lafayette National Park, 1919 became Acadia National Park, 1929

² Originally established as Arches National Monument, 1929; became national park, 1971

³ Originally established as Bryce Canyon National Monument, 1923; became Utah National Park, 1924, became Bryce Canyon National Park, 1928

⁴ Originally established as Capitol Reef National Monument, 1937 became national park, 1971

⁵ Originally established as Carlsbad Cave National Monument, 1923 became Carlsbad Caverns National Park, 1930

⁶ Originally established as Grand Canyon National Monument, 1908, became national park, 1919 Former Grand Canyon National Monument (established 1932) former Marble Canyon National Monument (established 1969) part of Lake Mead National Recreation Area, and other lands incorporated into park in 1975

⁷ Includes part of former Jackson Hole National Monument incorporated into park in 1950

⁸ Originally part of Hawaii National Park, became separate national park, 1961

⁹ Originally established as Hawaii National Park, 1916; became Hawaii Volcanoes National Park, 1961

¹⁰ Originally established as Hot Springs Reservation, 1832, became national park, 1921

¹¹ Includes former General Grant National Park, established 1890

¹² Includes Lassen Peak and Cinder Cone national monuments, established 1907

¹³ Originally established as Mount Olympus National Monument, 1909; became Olympic National Park, 1938

¹⁴ Originally established as Petrified Forest National Monument, 1906, became national park, 1962

¹⁵ Originally established as Mukuntuweap National Monument, 1909; enlarged and designated Zion National Monument, 1918; became national park, 1919

NATIONAL PARK SERVICE

Name	Location	Total Acreage	Established	Outstanding Features
Abasco Flint Quarries and Texas Panhandle Pueblo Culture	Texas	92 56	1965	Quarry site from which pre-Columbian Indians fashioned projectile points, knives and scrapers
Acadia Ruins	New Mexico	27 14	1923	Ruins of 21st-century Indian town
Badlands	South Dakota	243 302 33	1929	Ruggedly eroded deposits containing great numbers of animal fossils
Bandelier	New Mexico	29 661 20	1916	Ruins of early Pueblo Indian homes
Biscayne	Florida	103 701 18	1968	Living coral reef in Atlantic Ocean and Biscayne Bay
Black Canyon of the Gurnison	Colorado	13 672 13	1933	Awe-inspiring sheer-walled canyon with rocks of geologic interest
Booker T. Washington	Virginia	223 92	1957	Plantation containing one-room cabin where black educator was born
Buck Island Reef	Virgin Islands	850 00	1961	Outstanding marine gardens near Saint Croix include coral reefs, tropical fish, underwater trail
Cabrillo	California	1 350 38	1913	Memorial to Portuguese explorer Juan Rodriguez Cabrillo, discoverer of west coast of U.S. (1542)
Canyon de Chelly	Arizona	83 840 00	1931	Prehistoric Indian ruins, a base or walls of sheer red cliffs
Capulim Mountain	New Mexico	775 42	1916	Cone of recently extinct volcano
Casa Grande	Arizona	472 50	1892 ¹⁶	Ruins of 600-year-old Indian tower, only extant building of its type
Castillo de San Marcos	Florida	20 49	1924 ¹⁷	Oldest masonry fort in continental U.S.
Castle Clinton	New York	1 00	1950	Part of early defenses of New York harbor
Cedar Breaks	Utah	6 154 60	1933	Huge natural amphitheater in the Park Cliffs
Chaco Canyon	New Mexico	21 510 32	1907	Thirteen major ruins showing height of pre-Columbian Pueblo Indian civilization
Channel Islands	California	18 384 97	1938	Large sea lion rookery, unique plants and animals, land area 1120 03 acres
Chiricahua	Arizona	10 648 25	1924	Wilderness of unusual rock shapes
Colorado	Colorado	17 668 52	1911	Sheer-walled canyons, towering rocks
Craters of the Moon	Idaho	53 545 05	1924	Varied evidences of comparatively recent volcanic action
Custer Battlefield	Montana	765 34	1896 ¹⁸	Site of Battle of Little Bighorn (1876) fought between U.S. Cavalry and Sioux Indians
Death Valley	California-Nevada	2 067 966 93	1933	Desert solitude, weird natural phenomena, vast salt, borax deposits, lowest point in Western Hemisphere, 282 ft. below sea level
Davis Postpile	California	798 46	1911	Remnant of a basaltic lava flow
Devils Tower	Wyoming	1 346 91	1906	865-ft. tower of columnar volcanic rock
Dinosaur	Utah-Colorado	211 050 70	1915	Nation's richest dinosaur fossil quarries
Effigy Mounds	Iowa	1 467 50	1949	Prehistoric Indian earth mounds shaped like birds and bears
El Morro	New Mexico	1 278 72	1906	Inscription Rock, records of early Spanish and Anglo-American explorers, pre-Columbian petroglyphs
Florissant Fossil Beds	Colorado	5 992 32	1969	Oligocene fossil insects, seeds, and leaves ¹⁹
Fort Frederica	Georgia	214 52	1945	Built (1736-48) by British colonist General James Edward Oglethorpe
Fort Jefferson	Florida	47 125 00	1935	Largest 19th-century U.S. coastal fortification, bird refuge, underwater trail
Fort Matanzas	Florida	298 51	1924	Spanish fort built (1740-42) on site of Spanish slaughter of French in 1565
Fort McHenry National Monument and Historic Shrine	Maryland	43 26	1925 ²⁰	Successful defense of this fort in 1814 inspired writing of American national anthem
Fort Pulaski	Georgia	5 615 50	1924	Early 19th-century fortification
Fort Stanwix	New York	15 52	1935	American Revolutionary War battle site (1777), also scene of Treaty of Fort Stanwix (1784) with Iroquois Indians
Fort Sumter	South Carolina	64 27	1948	Site of opening engagement of Civil War
Fort Union	New Mexico	720 60	1956	Key fort of the Southwest (1851-91) on the Santa Fe Trail
Fossil Butte	Wyoming	8 178 00	1972	A semiarid region with many ancient fish fossils
George Washington Birthplace	Virginia	455 98	1930	Memorial mansion and gardens of estate of 1st U.S. President
George Washington Carver	Missouri	210 00	1951	Birthplace of famous black American scientist
Gila Cliff Dwellings	New Mexico	533 13	1907	Well-preserved cliff dwellings
Glauber Bay	Alaska	2 805 269 49	1925	Tidewater glaciers, rare wildlife
Grand Portage	Minnesota	709 97	1951 ²⁰	Overland trail, principal route into Northwest for traders, Indian explorers
Gran Quivira	New Mexico	610 94	1909	17th-century Spanish mission and pueblo ruins
Great Sand Dunes	Colorado	36 666 51	1932	Among largest and highest dunes in U.S.
Hohokam Pima	Arizona	1 555 40	1972	Archaeological findings of ancient Pima Indian culture, closed to public
Homestead National Monument of America	Nebraska	194 57	1939	Site of one of the first elements of the Homestead Act of 1862
Hovenweep	Utah-Colorado	785 43	1923	Pre-Columbian pueblos and cliff dwellings
Jewel Cave	South Dakota	1 274 56	1908	Limestone caverns and narrow passages
John Day Fossil Beds	Oregon	14 405 00	1974	Plant and animal fossils ranging from Eocene Epoch to end of Pleistocene Epoch
Joshua Tree	California	559 947 86	1936	Stand of rare Joshua trees
Katmai	Alaska	2 792 137 00	1918	Dying volcanic region, includes Valley of Ten Thousand Smokes

¹⁶ Originally established as Casa Grande Ruins, 1892, became Casa Grande National Monument, 1918.

¹⁷ Originally established as Fort Marion National Monument, 1924, became Castillo de San Marcos National Monument, 1942.

¹⁸ Established as National Cemetery of Custer's Battlefield Reservation, 1886, became Custer Battlefield National Monument, 1946.

¹⁹ Originally established as Fort McHenry National Park, 1925, became Fort McHenry National Monument and Historic Shrine, 1939.

²⁰ Originally established as Grand Portage National Historic Site, 1951, became national monument, 1958.

NATIONAL PARK SERVICE

Name	Location	Total Acreage	Established	Outstanding Features
Lava Beds	California	48 500 ±5	1925	Rare exhibit of volcanic activity believed to have occurred less than 1000 years ago, theater of Modoc Indian War (1872-73)
Leather Caves	Nevada	640 00	1922	Limestone caverns, tunnels, and galleries; stalagmites, stalactites, and helictites
Montezuma Castle	Arizona	841 75	1906	Among best-preserved cliff dwellings
Mound City Group	Ohio	67 50	1923	Group of pre-Columbian Indian mounds
Muir Woods	California	533 55	1908	Virgin stand of coastal giant redwood
Natural Bridges	Utah	7 779 14	1908	Three natural bridges of sandstone formed by erosion
Naval	Arizona	380 00	1909	Three of largest and most elaborate cliff dwellings
Onufre	Georgia	883 48	1936	Remains of Southern Mound-Builder civilization
Oregon Caves	Oregon	465 60	1909	Beautiful limestone caverns
Organ Pipe Cactus	Arizona	330 690 00	1937	Desert plants and animals found nowhere else in U.S., traces of historic Spanish route
Pecos	New Mexico	341 30	1966	Ruins of 14th-century pueblo, 17th-century Pecos mission, and 18th-century church
Pinnacles	California	14 497 77	1908	Rock formations, 500 to 1200 ft., caves and volcanic features
Pipe Spring	Arizona	40 00	1923	Historic fort built by Mormons
Pipstone	Minnesota	281 78	1937	Indian quarry, source of redstone for making ceremonial peace pipes
Rainbow Bridge	Utah	160 00	1910	Greatest known natural bridge
Russell Cave	Alabama	310 45	1961	Contains almost continuous human archaeological record, 8000 B.C.-1650 A.D.
Saguaro	Arizona	79 988 80	1933	Cactus forest unique to deserts of northwestern Mexico and southwestern Arizona
Saint Croix Island	Maine	35 39	1968	Commemorates French settlement of 1604 on Saint Croix Island in Saint Croix R. on Canadian border ²¹
Scotts Bluff	Nebraska	2 987 97	1919	Landmark on Oregon Trail
Statue of Liberty	New York-New Jersey	58 38	1924	Universal symbol of freedom and democracy; gift of French people
Sunset Crater	Arizona	3 040 00	1930	Volcanic cinder cone with summit crater, colorful upper part shading to black volcanic ash
Timpanogos Cave	Utah	250 00	1922	Limestone cavern on side of Mt. Timpanogos
Tonto	Arizona	1 120 00	1907	Well-preserved 14th-century Salado Indian cliff dwellings
Tumacacori	Arizona	10 15	1908	Historic Spanish Catholic mission
Tuzigoot	Arizona	57 78	1939	Excavated ruins of pre-Columbian pueblo
Walnut Canyon	Arizona	2 249 46	1915	Pueblo Indian cliff dwellings
White Sands	New Mexico	145 334 76	1933	Glistening white gypsum sand dunes
Wupatki	Arizona	35 253 24	1924	Red sandstone pre-Columbian pueblos
Yucca House	Colorado	10 00	1919	Unexcavated ruins of large pre-Columbian Indian pueblos, closed to public

NATIONAL PRESERVES

Big Cypress	Florida	585 000 00	1974 ²²	Adjoins northwest part of Everglades National Park, abundant subtropical flora and fauna
Big Thicket	Texas	84 550 00	1974 ²³	Unique ecosystem containing 300 bird species, alligators, ocelots, and other wildlife

NATIONAL SCIENTIFIC RESERVE

Ice Age	Wisconsin	32 500 00*	1964	Nationally significant features of continental glaciation, only State parks in area are open to public
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NATIONAL HISTORICAL PARKS

Appomattox Court House	Virginia	994 68	1930 ²⁴	Site of Confederate General Robert E. Lee's surrender to Northern General Ulysses S. Grant at close of American Civil War
Boston	Massachusetts	34 74	1974	Faneuil Hall, Bunker Hill, Boston Naval Shipyard, and other historical places
*Chalmette	Louisiana	142 86	1907 ²⁵	Scene of Battle of New Orleans (1814-15) during the War of 1812; military cemetery
Chesapeake and Ohio Canal	Maryland-West Virginia-District of Columbia	20 340 59	1971	Preserved 184-mi. early waterway National monument (1961-71)
City of Refuge	Hawaii	181 80	1961	Ruins of ancient city; former sanctuary for vanquished warriors, outcasts, and others
Colonial	Virginia	9 210 28	1930 ²⁶	Jamestown Island (1607), first permanent English settlement in America; Yorktown, scene of final battle (1781) of American Revolution
Cumberland Gap	Kentucky-Tennessee-Virginia	20 279 23	1955	Appalachian mountain pass of Wilderness Road, explored by American pioneer Daniel Boone
George Rogers Clark	Indiana	24 30	1966	Dorned memorial to American Revolutionary hero of the West
Harpers Ferry	West Virginia-Maryland	1 957 94	1944 ²⁷	Site of 1859 raid by American abolitionist John Brown, scenic and historic parkland in Blue Ridge Mts.
Independence	Pennsylvania	21 46	1956 ²⁸	Historic Philadelphia buildings, associated with founding and growth of U.S.

²¹ Originally established as Appomattox Battlefield Site, 1930, became Appomattox Court House National Historical Monument, 1940; became national historical park, 1964

²² Originally established as Chalmette Monument and Grounds, 1907, became national historical park, 1939

²³ Originally established as Colonial National Monument, 1930, became national historical park, 1936

²⁴ Originally established as Harpers Ferry National Monument, 1944; became national historical park, 1963

²⁵ Includes former Philadelphia Custom House National Historic Site, established 1939

Name	Location	Total Acreage	Established	Outstanding Features
Minute Man	Massachusetts	6	1909 ²⁰	Selected as the only memorial at the site of the Battle of Concord (1775)
Montezuma	New Mexico	1,544.7	1933	Major military installation during the Mexican Revolution (1910-1911)
Nez Percé	Idaho	2,805.0	1965	General George Washington's battle site (1775-76) and the Nez Percé Indian Reservation
San Juan Island	Washington	75.99	1966	Commemorates the peaceful relationship between the United States and Great Britain (1859-1872)
Saratoga	New York	2,324.1	1948	Site of decisive American victory (1777) over British during American Revolution
Sitka	Alaska	107.7	1910 ²¹	Site of the Tlingit Indian stand against Russian occupation (1804) and totem poles

HISTORIC AREA

Fort Scott	Kansas	6.69	1965	Commemorates historic event during Civil War	Kansas prior
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NATIONAL HISTORIC SITES

Abraham Lincoln Birthplace	Kentucky	116.50	1909 ²²	Traditional birthplace of 16th U.S. President
Adams	Massachusetts	8.5	1946 ²³	Home of 2nd and 6th U.S. Presidents and other noted members of Adams family
Allegheny Portage Railroad	Pennsylvania	767.05	1964	Commemorates Pennsylvania Canal and Allegheny Portage Railroad 38-m incline-plane railroad which lifted passengers and cargoes of analboats over the Allegheny Mts.
Andersonville	Georgia	488.5	1970	Includes Civil War prisoner-of-war camp and national cemetery
Andrew Johnson Birthplace	Tennessee	16.68	1942 ²⁴	Home of 17th U.S. President
Antelope	Colorado	7.00	1963	Frontier trading post and stopover on Santa Fe Trail
Carl Sandburg Home	North Carolina	37	1972	Commemorates the American poet's home and farm for the last 22 years of his life
Chicago Portage	Illinois	91.20 ²⁵	1952	Section of portage disused by explorers Jacques Marquette and Louis Joliet and used by French and later American pioneers as economic foundation of Chicago
Chimney Rock	Nebraska	83.36	1956	Famous landmark and campsite on Oregon Trail towers 500 ft. above North Platte R.
Christiansburg	Virgin Islands	28.40	1952	Structure commemorating Danish colonial development of Virgin Islands
Clara Barton	Maryland	0.8	1974	The large home of the founder of the American National Red Cross
Dorchester Heights	Massachusetts	5.43	1951	Memorial tower and green marking site of colonial batteries that helped to force the British evacuation of Boston (1776)
Edison	New Jersey	13.96	1955 ²⁶	Home workrooms, models, library of American inventor Thomas Alva Edison
Eisenhower	Pennsylvania	492.54	1967	Home and farm of Dwight D. Eisenhower 34th U.S. President closed to public
Ford's Theatre	District of Columbia	0.25	1970 ²⁷	Ford Theatre where President Abraham Lincoln was shot, restored house where he died museum
Fort Bowie	Arizona	970.00	1972	Ruins of fort, established 1862 focal point of military operations against the Indian chieftain Geronimo and his band of Apaches
Fort Davis	Texas	460.00	1983	Frontier army post (1854-91) protecting immigrants from hostile Indians
Fort Laramie	Wyoming	571.36	1938 ²⁸	Major military fort (1834-80) guarding Oregon Trail
Fort Larned	Kansas	718.99	1964	Fort associated with protection of the Santa Fe Trail base for military operations in the Indian war of 1868-69
Fort Point	California	28.00	1971	19th-century coastal fortification
Fort Raleigh	North Carolina	159.80	1941	First attempted English settlement in North America (1585-87)
Fort Smith	Arkansas	18.56	1964	One of first U.S. military posts (1817-50) in Louisiana Purchase
Fort Union Trading Post	North Dakota-Montana	999.69	1966	Ruins of principal fur trading depot (1829-67) in Upper Missouri R. region
Fort Vancouver	Washington	209.24	1954 ²⁹	Western headquarters of Hudson's Bay Company (1825-48)

²⁰Originally established as Minute Man National Historic Site, 1909, became national historical park, 1959.

²¹Originally established as Sixes National Monument, 1910, became national historical park, 1972.

²²Originally established as Abraham Lincoln National Park, 1916, became Abraham Lincoln National Historical Park, 1939; became Abraham Lincoln Birthplace National Historic Site, 1959.

²³Originally established as Adams Mansion National Historic Site, 1946; became Adams National Historical Site, 1952.

²⁴Originally established as Andrew Johnson National Monument, 1942, became national historic site, 1963.

²⁵Originally established as Virgin Islands National Historic Site, 1952; became Christiansburg National Historic Site, 1966.

²⁶Home designated, 1955; laboratory proclaimed as national monument, 1956, areas combined, 1962.

²⁷Combined House Where Lincoln Died National Monument established 1965, and Ford's Theatre (Lincoln Museum) National Memorial originally Ford's Theatre established 1966, and redesignated Lincoln Museum 1952 and renamed Ford's Theatre (Lincoln Museum) 1965.

²⁸Originally established as Fort Laramie National Monument, 1938, became national historic site, 1960.

²⁹Originally established as Fort Vancouver National Monument, 1954, became national historic site, 1961.

NATIONAL PARK SERVICE

Name	Location	Total Acreage	Established	Outstanding Features
Groesbeek Old Swedish Church	Pennsylvania	3.73	1942	Second oldest Swedish church in U.S. founded 1677; present structure erected about 1700; splendid example of early Swedish architecture in America
Golden Spike	Utah	2,203.20	1957 ³⁶	Commemorates completion of first transcontinental railroad in U.S. (1869)
Grant-Kohrs Ranch	Montana	1,564.30	1972	Headquarters area of one of largest U.S. range ranches in 19th century
Hampton	Maryland	45.42	1948	Noted late 18th century Georgian mansion
Herbert Hoover	Idaho	186.60	1965	Birthplace; boyhood home and burial place of 31st U.S. President
Home of Franklin D. Roosevelt	New York	187.69	1945	Birthplace; home; summer White House; and burial place of 32nd U.S. President
Hopewell Village	Pennsylvania	848.06	1938	Early 19th-century iron-making village
Hubbell Trading Post	Arizona	160.09	1965	Still active early 20th-century trading post illustrating part played by Indian reservation traders in settling the West
Jamestown	Virginia	20.63*	1940	Part of site of first permanent English settlement in North America (1607)
Jefferson National Expansion Memorial	Missouri	90.96	1935	Commemorates U.S. territorial expansion west of Mississippi R.; includes stainless steel arch (1965) designed by Finnish architect Eero Saarinen
John Fitzgerald Kennedy	Massachusetts	0.09	1967	Birthplace and early boyhood home of 35th U.S. President
John Muir	California	8.90	1964	House and adobe of American naturalist
Kristen River Indian Villages	North Dakota	1,292.00	1974**	Remains of five Hidatsa Indian villages last inhabited in 1845
Lincoln Home	Illinois	12.28	1971	Residence of Abraham Lincoln when he left to accept the presidency 1861
Longfellow	Massachusetts	1.98	1972**	House where poet Henry Wadsworth Longfellow lived (1837-82)
Lyndon B. Johnson	Texas	240.64	1969	Birthplace; boyhood home and ranch of 36th U.S. President
Mar-a-Lago	Florida	17.17	1969	Private mansion typifying baronial life-style engendered by Florida land boom of 1920s, closed to public
Martin Van Buren	New York	42.00	1974***	Lindenwald estate; the home (1841-62) of 8th U.S. President
McLoughlin House	Oregon	0.63*	1941 ³⁷	Home (1847-57) of Dr. John McLoughlin; important figure in early development of Pacific Northwest
Pennsylvania Avenue	District of Columbia	—	1965	Section of Pennsylvania Avenue and area adjacent to it between the Capitol and the White House, encompassing Ford's Theatre, the Federal Triangle, Judiciary Square, Treasury Building, and parts of the city's commercial district
Puukohola Heiau	Hawaii	76.57	1972**	Remains of Temple on the Hill of the Whale built (1791) by King Kamehameha I
Sagamore Hill	New York	85.00	1963	Home of Theodore Roosevelt; 26th U.S. President from 1885 until his death; served as summer White House
Saint-Gaudens	New Hampshire	86.00	1964	Memorial to American sculptor Augustus Saint-Gaudens; contains his home, studio, and gardens
Saint Paul's Church	New York	6.09*	1943	18th-century church connected with events leading to freedom of the press trial (1735) centered around German American publisher John Peter Zenger; also associated with American Revolution
Saint Thomas	Virgin Islands	1.66*	1960	Contains Fort Christian (completed 1680); oldest standing structure in Virgin Islands
Salem Maritime	Massachusetts	8.80	1938	Important in New England maritime, architectural and literary history
San Jose Mission	Texas	4.13*	1941	One of the finest Spanish missions (1720) in North America
San Juan	Puerto Rico	53.20	1949	Massive masonry fortifications; oldest in U.S. territorial limits, begun by Spain in 16th century
Saugus Iron Works	Massachusetts	8.61	1968	Reconstruction of first integrated ironworks in North America (mid 17th century)
Sewall-Beaumont House	District of Columbia	0.35	1974***	One of the oldest buildings on Capitol Hill (rebuilt after fire damage in 1814); includes exhibits commemorating Alice Paul; 20th-century U.S. woman-suffrage advocate
Springfield Armory	Massachusetts	55.00	1974**	Small-arms manufacturing center from 18th century until 1966; has a museum of Confederate and other small arms ³⁸
Theodore Roosevelt Birthplace	New York	0.11	1963	Birthplace of 26th U.S. President
Theodore Roosevelt Inaugural	New York	1.03	1966**	Anselmy Wilcox House; where Theodore Roosevelt took the oath of office as 26th U.S. President in 1901
Touro Synagogue	Rhode Island	0.23*	1946	Fine example of colonial religious architecture
Tuskegee Institute	Alabama	68.80	1974*	Home of Booker T. Washington who founded the institute in 1881; George Washington Carver Museum
Vanderbilt Mansion	New York	211.65	1940	Palatial residence of late 1800s

³⁶ Authorized for Federal ownership and administration in 1965

³⁷ Originally established as McLoughlin Home National Site 1941; became McLoughlin House National Historic Site 1945

NATIONAL PARK SERVICE

Name	Location	Total Acreage	Established	Outstanding Features
Whitman Mission	Washington	98 15	1940 ³⁶	Oregon trail site where American missionary Dr. Marcus Whitman served Indians until killed by them in 1847
William Howard Taft	Ohio	0 53	1969	Birthplace and early home of 27th U.S. President

NATIONAL MILITARY PARKS

Chickamauga and Chattanooga	Georgia-Tennessee	8 088.73	1890	Civil War battlefield important in operations around Chattanooga (1863)
Port Donelson	Tennessee	537.95	1928	Civil War fortification controlling upper Cumberland R. captured (1862) by Northern General Ulysses S. Grant
Fredericksburg and Gettysburg	Virginia	6 045.29	1927	Major Civil War battles fought here between 1862 and 1864
Gettysburg	Pennsylvania	3 909.82	1895	Site of decisive Civil War battle (1863)
Guilford Courthouse	North Carolina	220.44	1917	Site of decisive battle (1781) leading to end of American Revolution
Horseshoe Bend	Alabama	2 040.00	1959	Site of 1814 defeat of Creek Indian forces, leading to white settlement of Alabama
Kings Mountain	South Carolina	3 945.29	1931	Site of important battle during American Revolution
Moore's Creek	North Carolina	42.23	1926	Site of victory of North Carolina Patriots over Loyalists (1778)
Pea Ridge	Arkansas	4 300.35	1960	Site of important Civil War battle (1862)
Shiloh	Tennessee	3 753.00	1894	Civil War battlefield (1862); well-preserved Indian mounds
Vicksburg	Mississippi	1 740.78	1899	Civil War fortifications of 47-day siege of Vicksburg (1863)

NATIONAL BATTLEFIELD PARKS

Kennesaw Mountain	Georgia	2 884.38	1917 ³⁹	Civil War battlefield of Atlanta campaign (1864)
Manassas	Virginia	3 031.67	1940	Civil War battles of Manassas (1861-1862)
Richmond	Virginia	745.93	1944	Civil War battles to capture Richmond (1862-65)

NATIONAL BATTLEFIELDS

Big Hole	Montana	655.61	1910 ⁴⁰	Site of major battle (1877) between U.S. Army and Nez Percé Indians, led by Chief Joseph
Cowpens	South Carolina	833.18	1929 ⁴¹	American Revolution battlefield (1781)
Fort Mifflin	Pennsylvania	911.50	1931 ⁴²	First battle (1754) of French and Indian War
Petersburg	Virginia	2 716.36	1926 ⁴³	Site of Civil War Battle of the Crater and of longest siege in U.S. history (1864-65)
Stones River	Tennessee	329.96	1927 ⁴⁴	Scene of Civil War battle (1862-63) that began Federal offensive to trisect Confederacy
Tupelo	Mississippi	1 00	1929 ⁴⁵	Civil War battlefield (1864)
Wilson's Creek	Missouri	1 749.91	1965 ⁴⁶	Site of early Civil War battle (1861) for control of Missouri

NATIONAL BATTLEFIELD SITES

Antietam	Maryland	1 800.00	1890	Civil War battlefield (1862)
Brices Cross Roads	Mississippi	1 00	1929	Civil War battlefield (1864)

NATIONAL CEMETERIES

Antietam (Sharpsburg)	Maryland	11.36	1862 ⁴⁷	Segments represent States; interments: 5042 (1836 unknown)
Battleground	District of Columbia	1.03	1864 ⁴⁸	Interments: 44
Fort Donelson	Tennessee	15.34	1867 ⁴⁹	Interments: 1042 (512 unknown)
Fredericksburg	Virginia	12.00	1865 ⁵⁰	Interments: 15,353 (12,748 unknown)
Gettysburg	Pennsylvania	20.68	1863 ⁵¹	Interment: 6270 (1665 unknown); site of Lincoln's Gettysburg Address (1863)
Poplar Grove (Petersburg)	Virginia	8.72	1866 ⁵²	Campground of the 50th Regiment N.Y. Engineers; interments: 8315 (4110 unknown)
Shiloh (Pittsburg Landing)	Tennessee	10.05	1866 ⁵³	Interments: 3746 (2370 unknown)
Stones River	Tennessee	20.09	1865 ⁵⁴	Interments: 6831 (2682 unknown)
Vicksburg	Mississippi	115.28	1865 ⁵⁵	Interments: 18 207 (12,954 unknown)
Yorktown	Virginia	2.91	1866 ⁵⁶	Interments: 2183 (1434 unknown)

Note. Andrew Johnson National Historic Site and Ouster Battlefield National Monument contain active cemetery sections, Chalmette National Historical Park contains inactive cemetery section.

³⁶ Originally established as Whitman National Monument, 1940; became national historic site, 1963.

³⁷ Originally established as Kennesaw Mountain National Battlefield Site, 1917; became national battlefield park, 1935.

³⁸ Originally established as Big Hole Battlefield National Monument, 1910; became national battlefield, 1963.

³⁹ Originally established as Cowpens National Battlefield Site, 1929; became national battlefield, 1972.

⁴⁰ Originally established as Fort Mifflin National Military Park, 1931; became national battlefield, 1961.

⁴¹ Originally established as Petersburg National Military Park, 1927; became national battlefield, 1962.

⁴² Originally established as Stones River National Military Park, 1927; became national battlefield, 1961.

⁴³ Originally established as Tupelo National Battlefield Site, 1929; became national battlefield, 1970.

⁴⁴ Originally established as Wilson's Creek National Battlefield Park, 1965; became national battlefield, 1970.

⁴⁵ Possible Civil War interment date.

⁴⁶ First interment.

NATIONAL PARK SERVICE

Name	Location	Total Acreage	Established	Outstanding Features
NATIONAL MEMORIALS				
Arkansas Post	Arkansas	304.60	1965	First permanent French settlement in Lower Mississippi Valley (1686)
Arlington House The Robert E. Lee Memorial	Virginia	3.47	1925 ⁴⁹	Pre-Civil War home of families of Confederate General Robert E. Lee and his wife Mary Custis Lee permanent memorial to Robert E. Lee
Bengamin Franklin	Pennsylvania	0.01	1972	Colossal statue of Franklin by James Earle Fraser in the Rotunda of the Franklin Institute, Philadelphia
Chamizal	Texas	54.90	1966	Memorializes peaceful settlement by Chamizal Treaty (1963) of 99-year boundary dispute between U.S. and Mexico ⁵⁰
Coronado	Arizona	2,634.16	1952	Commemorates Spanish adventurer Francisco Vázquez de Coronado's exploration of the Southwest (1540-42)
De Soto	Florida	30.00	1949	Vicinity where Spanish explorer Hernando de Soto landed (1539)
Federal Hall	New York	0.45	1939 ⁵¹	1842 building on site of first seat of Federal government
Fort Caroline	Florida	128.88	1953	Site of 16th-century French Huguenot colony
Fort Clatsop	Oregon	124.97	1962	Site of Lewis and Clark Expedition winter encampment (1805-06)
Frederick Douglass Home	District of Columbia	8.06	1962	From 1877 to 1895 home of leading 19th-century black American spokesman ⁵²
General Grant	New York	0.76	1959	Contains tombs of Ulysses S. Grant 18th U.S. President, and his wife
Hamilton Grange	New York	0.71	1962	Home of American statesman Alexander Hamilton
Johnstown Flood	Pennsylvania	106.70	1964	Memorializes flood of 1889
Lincoln Boyhood	Indiana	200.00	1963	Childhood home of 16th U.S. President
Lincoln Memorial	District of Columbia	163.63	1911	Beautiful classic structure with large seated statue of 16th U.S. President by Daniel Chester French
Mount Rushmore	South Dakota	1,278.45	1925	Colossal carved heads of U.S. Presidents George Washington Thomas Jefferson Abraham Lincoln and Theodore Roosevelt by Gutzon Borglum
Perry's Victory and International Peace Memorial	Ohio	25.64	1936 ⁵³	Memorial (built 1912-15) commemorating peace between U.S. and Canada near the site of the U.S. naval victory under Captain Oliver Hazard Perry during War of 1812
Roger Williams	Rhode Island	4.58	1965	Memorial to founder of Rhode Island Colony and pioneer in religious freedom closed to public
Thaddeus Kosciuszko	Pennsylvania	0.01	1972	Commemorates life and work of the Polish-born military leader who aided the colonists during the American Revolution
Thomas Jefferson	District of Columbia	18.36	1934	Classic rotunda interior inscriptions based on writings of 3rd U.S. President
Washington Monument	District of Columbia	106.01	1848	Obelisk commemorating 1st U.S. President
Wright Brothers	North Carolina	431.40	1927 ⁵²	Memorial shaft and rebuilt camp on site of first sustained heavier-than-air flight made (1903) by American inventors Wilbur and Orville Wright
NATIONAL MEMORIAL PARK				
Theodore Roosevelt	North Dakota	70,408.64	1947	Badlands along Little Missouri R. part of ranch belonging to 26th U.S. President
INTERNATIONAL PARK				
Roosevelt Campobello	New Brunswick, Canada	2,721.50 ⁵³	1964	Memorial to U.S. President Franklin D. Roosevelt, stricken with poliomyelitis here as a young man his summer home
NATIONAL SEASHORES				
Assateague Island	Maryland-Virginia	39,630.92	1965 ⁵⁴	37-mi long barrier island home of the Chincoteague ponies
Canaveral	Florida	67,500.00	1975	Great variety of wildlife including many species of birds ⁵⁵
Cape Cod	Massachusetts	44,800.00	1966	Ocean beaches dunes woodlands on outer cape traditional landmark for mariners
Cape Hatteras	North Carolina	30,326.24	1953	Beaches; waterfowl fishing; points of historical interest
Cape Lookout	North Carolina	24,500.00	1966 ⁵⁶	Barrier islands of Lower Outer Banks, embracing ocean beaches dunes salt marshes, and Cape Lookout Lighthouse ⁵⁷
Cumberland Island	Georgia	36,876.51	1972	Magnificent beaches, dunes marshes, and freshwater lakes closed to public
Fire Island	New York	19,311.00	1964 ⁵⁸	Ocean beaches, dunes Sunken Forest with dense foliage some below sea level
Gulf Islands	Florida-Mississippi	142,062.49	1971	Historic forts and sandy beaches on offshore islands
Padre Island	Texas	133,916.72	1968	57.5-mi stretch of barrier island along Gulf coast; beaches, fishing wildlife
Point Reyes	California	66,000.83	1972	Beaches backed by cliffs; lagoons forests; offshore bird and sea-lion colonies

⁴⁹ Originally established as Custis-Lee Mansion, 1925, changed to Arlington House The Robert E. Lee Memorial, 1972.
⁵⁰ Originally established as Federal Hall Memorial National Historic Site, 1939, changed to Federal Hall National Memorial, 1955.
⁵¹ Originally established as Perry's Victory and International Peace Memorial National Monument, 1936; became national memorial, 1972.
⁵² Owned and administered by a joint U.S.-Canadian commission.

NATIONAL PARK SERVICE

Name	Location	Total Acreage	Established	Outstanding Features
NATIONAL LAKESHORES				
Applegate Islands	Wisconsin	42 011 82	1970	11 mi. strip of mainland and 20 islands in Lake Superior
Indiana Dunes	Indiana	8 329 81	1966 ^{a,b}	Dramatic 200 ft. high sand dunes along Lake Michigan's southern shore, beaches and winter lands
Pictured Rocks	Michigan	68 918 90	1966 ^c	Scenic area on Lake Superior featuring multicolored sandstone cliffs, beaches, sandbars, dunes and North Woods lake country
Sleeping Bear Dunes	Michigan	71 105 00	1970	Beaches, sand dunes, forests and lakes along Lake Michigan
NATIONAL RIVER				
Buffalo	Arkansas	94 146 00	1972	Authorized as the first national river; encompasses 32 mi. of Buffalo R.; fishing, beaches, limestone cliffs, caves, waterfalls ^a
NATIONAL SCENIC RIVERWAYS				
Lower Saint Croix	Minnesota-Wisconsin	7 845 00	1972 ^{a,b}	About 27 mi. of Saint Croix R.; recreational opportunities
Ozark	Missouri	79 907 00	1964 ^a	Outstanding sections of free-flowing Current and Jacks Fork rivers; freshwater springs, caves
Saint Croix	Minnesota-Wisconsin	62 727 61	1969	Some 200 mi. of Saint Croix and Namekagon rivers
NATIONAL SCENIC TRAIL				
Appalachian	14 States, from Maine to Georgia	50 000 00	1968	Recreation foot trail containing significant wilderness section extends 2000 mi. along Appalachian Mts. from Maine to Georgia
NATIONAL PARKWAYS				
Blue Ridge	Virginia-North Carolina-Georgia	90 760 98	1936	Scenic Parkway follows crest of Blue Ridge Mts. Georgia section not completed
George Washington Memorial	Virginia-Maryland	6 960 33	1930	Connects many interesting landmarks along Potomac R.; associated with life of 1st U.S. President
John D. Rockefeller, Jr. Memorial	Wyoming	23 777 72	1972 ^{a,b}	A scenic 82-mi. corridor linking Yellowstone and Grand Teton national parks; commemorates Rockefeller's aid in establishing many parks
Natchez Trace	Mississippi-Tennessee-Alabama	46 928 51	1938 ^a	Generally follows old Indian trail from Nashville to Natchez
NATIONAL RECREATION AREAS				
Amistad	Texas	62 451 74	1965	Borders U.S. part of Amistad Reservoir on Rio Grande R.
Bighorn Canyon	Wyoming-Montana	140,459 20	1966	Surrounds Bighorn Lake created by Yellowstone Dam; Crow Indian Reservation borders large part of area
Chickasaw	Oklahoma	8,052.17	1976 ^a	Lake of the Arbuckles; numerous cold mineral springs
Coulter Dam	Washington	100 059.00	1946	Franklin D. Roosevelt Lake formed by dam
Curecanti	Colorado	41 571 66	1965	Blue Mesa and Morrow Point lakes and Crystal Reservoir components of Curecanti Unit of Colorado River Storage Project
Cuyahoga Valley	Ohio	29 112 19	1974 ^{a,b}	Cuyahoga R. valley between Akron and Cleveland includes part of historic Ohio Canal system ^{a,b}
Delaware Water Gap	Pennsylvania-New Jersey	58,985.46	1965	Outstanding scenery along Delaware R.
Gateway	New York-New Jersey	26 172.00	1972	Entrance to New York Bay, beaches, marshes and islands
Glen Canyon	Arizona-Utah	1,234 180.00	1972	Colorado R. behind one of the highest dams in the world forms Lake Powell
Golden Gate	California	33,927.69	1972	Beaches, lagoons, and marshes in and near San Francisco; also includes Alcatraz Island
Lake Mead	Washington	62,000 00	1968	Fjordlike area on southeast edge of North Cascades National Park
Lake Mead	Arizona-Nevada	1,486,139 87	1936 ^a	Formed by Hoover Dam on Colorado R.; largest U.S. man-made lake; area also contains Lake Mojave formed by Davis Dam
Lake Meredith	Texas	45,964.30	1965 ^a	Surrounds Sanford Reservoir (Lake Meredith) on Canadian R.
Ross Lake	Washington	109,386 56	1968	Fjordlike lake and surrounding lands divide northern and southern units of North Cascades National Park
Shadow Mountain	Colorado	19,003.58	1952	Two lakes and a reservoir at west entrance of Rocky Mountain National Park

^a Actia Battleground and Meriwether Lewis national monuments added to parkway, 1961

^b Includes former Platt National Park (established 1906), former Arbuckle National Recreation Area (established 1965) and other lands

^c Originally established as Boulder Dam National Recreation Area, 1936; renamed Lake Mead National Recreation Area, 1947

^d Originally established as Sanford National Recreation Area, 1965; changed to Lake Meredith National Recreation Area, 1972

NATIONAL PARK SERVICE

Name	Location	Total Acreage	Established	Outstanding Features
Whiskeytown-Shasta-Trinity	California	42,570.70	1965	Whiskeytown Lake, other water-recreation areas

WHITE HOUSE

White House	District of Columbia	18.07	1943	Residence and office of U.S. President since 1800; extensively renovated during 1949-52
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PARKS (other)

Catoctin Mountain Park	Maryland	5,768.90	1936 ²⁸	Organized group and family camping in mountain setting
John F. Kennedy Center for the Performing Arts	District of Columbia	17.50	1958 ²⁹	Building (designed by Edward Durell Stone) containing theater, opera house, and concert hall; coadministered with Smithsonian Institution
National Capital Parks	District of Columbia-Virginia-Maryland	7,495.49	1790 ²⁹	Park system of the nation's capital, comprises 357 reservations
Piscataway Park	Maryland	4,014.23	1968	Preserves tranquil view from Mt. Vernon of opposite Maryland Potomac shore ³⁰
Prince William Forest Park	Virginia	18,571.55	1936 ²⁹	Woodland with 89 species of trees, some 5 ft in diameter
Theodore Roosevelt Island	District of Columbia	88.50	1932	Wooded parkland on island in Potomac R.; memorializes conservationist 26th U.S. President; includes imposing statue of Roosevelt
Wolf Trap Farm Park for the Performing Arts	Virginia	130.28	1966	Provides artistic enjoyment and recreation in rolling, wooded, landscaped surroundings ³¹

²⁸ Catoctin Recreation Demonstration Area transferred from Resettlement Administration, 1936, changed to Catoctin Mountain Park, 1964.

²⁹ Transferred from Office of Public Buildings and Public Parks of the National Capital, 1933.

³⁰ Choptank Recreation Demonstration Area transferred from Resettlement Administration, 1936, changed to Prince William Forest Park, 1948.

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tection of natural, historic, or prehistoric features from damage by vandalism or by natural causes. In addition it provides activities and services, including lectures, guided tours, and campfire and informational programs, to meet the recreational needs of visitors to an area.

NATIONAL PORTRAIT GALLERY. See SMITHSONIAN INSTITUTION. *National Collection of Fine Arts.*

NATIONAL RECOVERY ADMINISTRATION (N.R.A.). See NATIONAL INDUSTRIAL RECOVERY ACT.

NATIONAL RESEARCH COUNCIL, organization established in 1916 by the National Academy of Sciences (q.v.) at the request of President Woodrow Wilson (q.v.), to promote research in science and engineering, and to encourage the application and dissemination of scientific knowledge. The council has eight divisions: behavioral sciences, biology and agriculture, chemistry and chemical technology, earth sciences, engineering, mathematical sciences, medical sciences, and physical sciences. The organization has over 400 members, most of whom are appointed representatives of scientific and technical societies, research institutions, and Federal agencies. Most of the work for the National Research Council is contracted for by Federal and State agencies, and is carried out by hundreds of standing and special com-

mittees, whose members receive no compensation. The council also administers post-doctoral fellowships in the natural sciences and medicine. See also NATIONAL SCIENCE FOUNDATION.

NATIONAL ROAD. See CUMBERLAND ROAD, ROAD. *History.*

NATIONAL SAFETY COUNCIL, privately supported public-service organization. It was established in the United States in 1913 as the result of an industrial safety congress held in Milwaukee, Wis., under the auspices of the Association of Iron and Steel Engineers. The goal of the council is to reduce accidents and diseases related to occupations. To this end, it works through industries, schools, and civic groups, by means of three techniques: dissemination of printed material, conferences, and field service.

Individual and industrial membership in the council is about 11,000. The council is supported by membership dues and contributions from foundations and associations. Headquarters is in Chicago, Ill. See ENGINEERING. *Safety Engineering; SAFETY.*

NATIONAL SCIENCE FOUNDATION, independent agency of the Federal government, established by an act of Congress in 1950, "to promote the progress of science, advance the national health, prosperity, and welfare, and secure the national defense". The foundation consists of a director and a board of twenty-four

members, appointed by the President with the approval of the Senate. The executive committee, composed of nine members, is elected by the board and the director. The foundation has four major divisions: mathematical, physical, and engineering sciences; biological and medical sciences; scientific personnel and education; and program analysis conducted by the Office of Scientific Information.

The principal functions of the foundation are the development of a national science policy and the support of basic research and education in the sciences. It provides funds primarily to educational institutions and supports supplementary training for science teachers. Graduate students are helped to gain advanced education, and the modernization of science curricula is encouraged. In addition to coordinating national research programs, the foundation makes four research laboratories available to qualified scientists and facilitates methods of disseminating scientific information. Headquarters is maintained in Washington, D.C.

NATIONAL SECURITY COUNCIL, agency of the Executive Office of the President of the United States, created by the National Security Act of 1947. The council is charged with advising the President in matters relating to the integration of domestic, foreign, and military policies affecting national security. Council members are the President, the Vice-President, the secretary of state, the secretary of defense, and the director of the Office of Emergency Preparedness. The chairman of the Joint Chiefs of Staff (see DEFENSE, DEPARTMENT OF) and the director of the Central Intelligence Agency (q.v.) attend meetings as statutory advisers to the council. Other officials of the executive branch attend council meetings at the invitation of the President.

NATIONAL SOCIALISM, or NAZISM, or HITLERISM, German political movement initiated in 1920 with the organization of the *Nationalsozialistische Deutsche Arbeiterpartei* (NSDAP, "National Socialist German Workers' Party"), or Nazi Party. The movement culminated in the establishment of the Third Reich, the autocratic, totalitarian German state led by the dictator Adolf Hitler from 1933 to 1945.

Origins and Rise of Nazism. National Socialism was similar in many respects to Italian fascism; see FASCISM. National Socialism, however, had roots that were peculiarly German, for example, in the Prussian tradition of military authoritarianism and expansion; in the German romantic tradition of hostility to rationalism, liberalism, and democracy; in various racist doc-

trines according to which the Nordic peoples, as so-called pure Aryans, were not only physically superior to other races but were the carriers of a superior morality and culture; and in certain philosophical traditions that idealized the state or exalted the superior individual and exempted him from conventional restraints. See NIETZSCHE, FRIEDRICH; TREITSCHKE, HEINRICH VON.

The theorists and planners of National Socialism included General Karl Haushofer (1869–1946), the German geographer who exercised much influence in German foreign affairs; see GEOPOLITICS. The German editor and party leader Alfred Rosenberg (1893–1946) formulated National Socialist racial theories on the basis of the work of the Scottish anthropologist Houston Stewart Chamberlain (1855–1927). To German financier Hjalmar Horace Greeley Schacht (1877–1970) fell the formulation and carrying out of much economic and banking policy, and German architect and party leader Albert Speer (1905–) was a major figure in overseeing the German economy just before the end of World War II (q.v.).

Effects of World War I. The immediate origins of National Socialism are to be found in the consequences of the German defeat in World War I. Under the terms of the Treaty of Versailles Germany was charged with sole responsibility for the war, stripped of its colonial empire, and forced to pay heavy reparations (q.v.); see VERSAILLES, TREATY OF. German political and economic life was seriously disrupted as a result of the treaty. Severe inflation, which reached its climax in 1923, all but destroyed the German middle class, leaving many of its impoverished and despairing members vulnerable to the appeals of the host of radical political groups that sprang up in the postwar years. Only a few years after some measure of economic stability and progress was achieved the worldwide economic crisis that began in 1929 plunged Germany into an apparently hopeless depression. During these years the democratic Weimar Republic was subjected to increasing attack from both left and right. The republic proved unable to cope effectively with the desperate condition of the country. By 1933 the majority of German voters supported one or the other of the two major totalitarian parties, the Communist and the National Socialist; see TOTALITARIANISM.

The National Socialist Party. The National Socialist Party originated in the German Workers' Party, formed in Munich in 1919. At the time that Hitler joined it in 1919, the German Workers' Party had a nominal membership of about twenty-five, only six of whom were active in its

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discussions and lecture activities; Hitler was given membership card number seven. Shortly afterward he became one of the leaders of the group. At the first public mass meeting of the German Workers' Party, held in Munich, on Feb. 24, 1920. Hitler read the party program, which had been written partly by him; this consisted of twenty-five points comprising a mixture of exaggerated nationalistic demands, corruptions of socialist ideas, and racialist and anti-Semitic doctrines. As the essential condition for the realization of its aims, the party declared in point twenty-five of the program: "For modern society, a colossus with feet of clay, we shall create an unprecedented centralization which will unite all powers in the hands of the government. We shall create a hierarchical constitution, which will mechanically govern all movements of individuals".

Hitler Assumes Complete Leadership. Some time after the meeting of February, 1920, Hitler's party changed its name to the National Socialist German Workers' Party. The new party grew slowly, and principally in Bavaria. Convinced of the necessity, indeed, the value, of violence to achieve its ends, the party soon organized the so-called *Sturmabteilungen* (SA, "storm troops") to defend its meetings, to disrupt the meetings of liberal democrats, Socialists, Communists, and trade unionists, and to carry out a program of anti-Semitism (q.v.) by persecuting Jews, especially Jewish merchants. It was aided in these activities by some disaffected army officers, notably Ernst Röhm. In 1921 Hitler was elected "unlimited chairman" of the party, which in the same year adopted as its official emblem a flag consisting of a red field in the center of which was a large white circle containing a black swastika. In 1923 Hitler established the newspaper *Völkischer Beobachter* ("Racial Observer") as the official daily party organ. As the German Communist Party, founded in 1919, grew in strength, the National Socialists concentrated much of their propaganda on denunciations of Bolshevism, which they characterized as a conspiracy of international Jewish financiers. They also loudly proclaimed their contempt for parliamentary democracy and agitated for a dictatorship.

The Beer-Hall Putsch. The year 1923 was important in the history of the National Socialist Party. On November 8 of that year, with 600 armed storm troopers, Hitler marched on the Bürgerbräuhalle in Munich, at which Gustav von Kahr (1862-1934), head of the provincial Bavarian government, was addressing a public meeting, took von Kahr and his associates pri-

soner, and, abetted by Field Marshal Erich Wilhelm Ludendorff, declared in von Kahr's name the formation of a new national government. Immediately thereafter von Kahr was released and turned against Hitler and Ludendorff. Following a brief skirmish with the Munich police on November 9, Hitler and his associates fled and the so-called beer-hall putsch failed. Hitler and Ludendorff were subsequently arrested. The latter went unpunished but Hitler was tried and received a five-year prison sentence, and the party was outlawed. In prison Hitler dictated *Mein Kampf* ("My Battle") to Rudolf Hess. As later expanded by Hitler, this was a frank statement of National Socialist doctrines, propaganda techniques, and plans for the conquest first of Germany and then of the world. In later years *Mein Kampf* became the bible of National Socialism.

Hitler was released from prison in little less than a year. The National Socialist Party was then in a state of virtual dissolution, in large part because improvement in the country's economic conditions had created an atmosphere more favorable to moderate political organizations. During the following years, with the aid of a small number of loyal associates, Hitler slowly rebuilt the party. In 1926 he established himself as the *Führer* ("Leader") of the party and organized the armed and black-shirted *Schutzstaffeln* (SS "defense corps"), known as the Elite Guard, to supervise and control the party and its semimilitary arm, the SA. Following the onset of the world economic depression in 1929, the flow of foreign capital into Germany ceased, the country's foreign trade declined, the wheels of German industry slowed, unemployment increased greatly, and agricultural prices fell. As the depression deepened, a revolutionary situation began to mature. Fritz Thyssen (1873-1951), head of the Thyssen combine of steel works and related enterprises, and other capitalists contributed large sums of money to the National Socialist Party. Numerous German capitalists were, however, unalterably opposed to National Socialism.

The Party in the Reichstag. The movement grew rapidly, however, recruiting thousands of discharged civil servants, ruined shopkeepers and small businessmen, impoverished farmers, workers disillusioned with the Socialist and Communist parties, and a host of frustrated and embittered young persons of all classes, brought up in the postwar years and without hope of personal economic security. In the Reichstag elections of 1930 the National Socialists polled almost 6,500,000 votes (more than 18 percent of

the total votes cast) against a little more than 800,000 (about 2.5 percent) in 1928. The 107 seats they won in that election made them the second largest party in the Reichstag, after the Social Democrats, who won 143 seats. The Communists, who polled 4,600,000 votes and who also made a considerable gain, had 77 seats.

The party took all possible advantage of the deepening depression from 1929 to 1932. Desperate efforts by Chancellor Heinrich Brüning (1885-1970) to save the democratic republic by emergency decrees did not succeed in stemming the growing tide of unemployment. Rather, his ineffectual government undermined what remained of belief in parliamentary democracy in Germany. As a consequence, Hitler drew a huge vote in the presidential elections of 1932, although he lost to President Paul von Hindenburg, who dismissed Brüning.

In the elections to the Reichstag held in July, 1932, the National Socialists polled 13,700,000 votes and won 230 of the total of 670 seats. Now the strongest party, but still lacking a majority, they were offered places in a coalition government by President von Hindenburg. Hitler refused and demanded sole power. The Reichstag was dissolved and in the elections to its successor, held in November, the party vote declined to approximately 11,700,000 and the party won only 196 seats. The combined Social Democratic and Communist vote was more than 13,000,000 and together they won 221 seats; but as these parties were bitter opponents, the NSDAP, despite its setback, was still the strongest party in the Reichstag. Again Hitler refused to enter a coalition government; and again the Reichstag was dissolved. Before other elections were held, Hindenburg, on Jan. 30, 1933, appointed Hitler chancellor. Then the party began the creation of the National Socialist state.

Late in February, almost at the close of the election campaign for a new Reichstag, the building housing the national parliament was destroyed by fire of incendiary origin. The National Socialists blamed the Communists and made the incident a pretext to suppress the Communist Party with brutal violence; later, the Social Democratic Party was also violently suppressed. Neither party offered organized resistance. All other parties were subsequently outlawed, the attempt to create a new party was made a crime, and the National Socialist Party became the only legal party. In the Enabling Act of March 24, 1933, the legislative powers of the Reichstag were passed to the cabinet. By a law enacted on Dec. 1, 1933, the NSDAP was "indissolubly joined to the state".

Organization of the Party After 1933. Thereafter the party was the principal instrument of the totalitarian control of the state and of German society, exercised through the leadership corps of the party. Party members soon held most high government offices, national, provincial, and local. Party members, men of "pure" German blood eighteen years or more of age swore allegiance to the Führer and according to Reich law were accountable for their actions only in special party courts. Nominally, membership in the party was voluntary, and millions willingly joined the NSDAP; but millions of others were compelled to become members against their will. Many civil-service employees were required to join. At its peak, the party had an estimated membership of about 7,000,000.

THE SA, SS, AND SD. The principal auxiliary organization of the NSDAP was the SA, officially designated as the "guarantor of the National Socialist revolution" and the "vanguard of National Socialism". It extorted large sums of money from the German workers and peasants through its annual "winter help" collections for the poor; conducted the training in National Socialism of all German youth through the age of seventeen; organized a thorough pogrom against the Jews in 1938; and, during World War II, supplied the indoctrination officers attached to the field forces of the German army, and led the home-defense forces of the Reich. Another important party formation was the SS, which during World War II organized special combat divisions to bolster the regular army at critical moments. Together with the little-known *Sicherheitsdienst* (SD, "Security Service"), the espionage agency of the party and the Reich, the SS controlled the NSDAP during the last years of the war. The SD operated the concentration camps for victims of National Socialist terrorism (see CONCENTRATION CAMP) and during the war played an important role in enabling Hitler to win control of the armed forces from the general staff. Still another important party auxiliary was the *Hitler Jugend* ("Hitler Youth" organization), which prepared boys of fourteen to seventeen years of age for membership in the SA, the SS, and the NSDAP. The *Auslandsorganisation* ("Foreign Organization") of the NSDAP conducted National Socialist propaganda and created, financed, and directed National Socialist organizations among Germans and persons of German extraction abroad.

REORGANIZATION OF GERMAN SOCIETY Hitler began the creation of the National Socialist state with the elimination of all working-class and liberal democratic opposition. The Reichs-

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tag fire trial served not only as the pretext for the suppression of the Communist and Social Democratic parties, but also for the abrogation of all constitutional and civil rights, and for the institution of concentration camps for victims of National Socialist terror.

The Gestapo. The *Geheime Staatspolizei* ("Secret State Police"), known as the Gestapo (q.v.), was created in 1933 to suppress opposition to the Hitler regime. In 1936, when it was incorporated into the state, the Gestapo was declared not subject to legal restraints and responsible only to its chief, Heinrich Himmler, and to Hitler.

Centralization and Coordination. From 1933 to 1935 the democratic structure of Germany was swept away and was replaced by a completely centralized state. The autonomy previously exercised in many matters by the provincial governments was eliminated, and these subnational governments were transformed into strictly controlled instruments of the central government. The Reichstag retained only a ceremonial, not a legislative, function. By a process of coordination (*Gleichschaltung*) all private organizations of business, labor, and agriculture, as well as education and culture, were subjected to party control and direction. Even the Protestant church was infiltrated by National Socialist doctrines. Special legislation excluded Jews from the protection of German law.

The Economy and the Purge of 1934. The most crucial problem the party leadership confronted on coming to power was unemployment. German industry was then operating at about 58 percent of capacity. Estimates of the number of jobless persons at that time in Germany vary from 6,000,000 to 7,000,000. Among them were tens of thousands of party members who expected Hitler to carry out the anticapitalist promises of National Socialist propaganda, put an end to the monopolistic enterprises and cartels, and revive industry through the establishment of a large number of small businesses. The party rank and file demanded a "second revolution". The SA, led by Ernst Röhm, included control of the Reichswehr (the army) in the program of the second revolution. Hitler had to choose between a "plebeian" National Socialist regime and an alliance with the industrialists of the country and the general staff of the Reichswehr. He chose the latter course. The result was the "night of the long knives" of June 30, 1934, under the direction of Hitler, Himmler, and Hermann Wilhelm Göring, in which a number of SA and party leaders includ-

ing Röhm and between 400 and 1000 of their followers, many of them innocent of any opposition to Hitler, were slaughtered. Also included in the purge were other enemies such as General Kurt von Schleicher (1882-1934) and some monarchists who had advocated restoration of the Hohenzollern dynasty.

The "New Order". Suppression of opposition parties and blood purges, however, did not provide a solution of the unemployment problem. To eliminate unemployment Hitler had to undertake the revival of German industry. His solution was the creation of the "new order", the basic premises of which were the following: The full and profitable utilization of the capacity of German industry could be achieved only by the restoration of Germany to a position of leadership in world trade, industry, and finance. Necessary sources of raw materials of which Germany had been deprived had to be reacquired and control of other necessary sources had to be established. An adequate merchant fleet and modern rail, air, and motor-transport systems had to be constructed. Industry had to be rationalized, that is, reorganized for the greatest possible efficiency.

Two necessary sets of conclusions were drawn from these premises. The first set recognized that carrying out the entire plan centered on the elimination of the economic and political restrictions imposed by the Treaty of Versailles, and that ultimately this step would result in war. Therefore the economy was to be reorganized essentially as a war economy. Germany had to be made completely self-sufficient in strategic raw materials by the development of synthetic substitutes for those materials in which the country was deficient and which could not be secured from abroad. An adequate supply of food was to be assured by the controlled development of agriculture. The second set of conclusions concerned the elimination of obstacles to the realization of the plan, arising from the struggle of the workers to win improvements in their condition and embodied organizationally in the trade unions and their auxiliary organizations.

Trade Unions. Concretely, the "new order" involved abolition of trade unions and cooperatives, confiscation of their financial and other assets, elimination of collective bargaining between workers and their employers, prohibition of strikes and lockouts, and compulsory membership by law of all German workers in the state-controlled *Deutsche Arbeitsfront* (DAF, "German Labor Front"). Wages were determined by the ministry of national economy.

Government officials, called trustees of labor and appointed by the minister of national economy, disposed of all questions relating to wages and hours and conditions of work.

BUSINESS AND INDUSTRY. The trade associations of businessmen and industrialists of the Weimar Republic were transformed into organs of state control. Membership by employers was compulsory. Supervision of these associations was vested in the ministry of national economy, which had the power to recognize trade organizations as the sole representatives of their respective branches of industry, to organize new associations, dissolve or merge existing ones, and appoint and recall the leaders of all the associations. Through the exercise of these powers and also as specifically empowered by law, the ministry of economy greatly expanded existing cartels and cartelized entire industries. The banks were similarly "coordinated". Private property rights were preserved and previously nationalized enterprises were "reprivatized", that is, returned to private ownership, but all owners were subject to rigid state controls. By all of these and related means the Hitler regime eliminated competition. Ultimately the "new order" was dominated in an economic sense by four banks and a relatively small number of huge combines, including the vast munitions and steel manufacturing empire of the Krupp (q.v.) family and the notorious *Interessengemeinschaft Farbenindustrie*, known as I. G. Farben, which produced dyes, synthetic rubber, oil, and other products, and participated in or dominated almost 400 enterprises. In close cooperation with and under the direction of the National Socialist state, the German combines conducted secret economic warfare against other countries. Thus I. G. Farben, for example, concluded agreements with British and American firms whereby I. G. Farben not only secured for itself a large share of the world market in the sale of certain products, but restricted its British and American associates from producing materials and products vital to the national security of their countries. During World War II, these enterprises made use of millions of prisoners of war and inhabitants of conquered countries as slave laborers in German industry. The cartels also supplied materials for the systematic and scientific extermination by the Hitler government of millions of Jews, Poles, Russians, and others. See **GENOCIDE**.

Ruinous Effects of Nazism. The creation of the "new order" enabled the National Socialists to eliminate unemployment, provide the German workers and farmers with a low standard of



Adolf Hitler surveys bomb ruins in a German town near the end of World War II.
U.S. Army

living, enrich the élite ruling group of the state, industry, and finance, and build a stupendous war machine. As they constructed their "new order" in Germany, they pressed forward politically and diplomatically for the creation of Greater Germany. The record of Hitler's foreign policy, full of grandiloquent boasting, deceit, treachery, and violence, constitutes an ugly chapter in the history of the German people and of Europe and is told in detail in the articles in this encyclopedia on Germany, Europe, Austria, Czechoslovakia, Spain, Italy, and the Union of Soviet Socialist Republics. The outstanding events of that era of totalitarian aggression were the remilitarization of the Rhineland (1936), formation of the Italo-German fascist "Axis" (1936), intervention in the Spanish Civil War (1936-39) in behalf of the fascists under Francisco Franco, *Anschluss* ("union", that is, annexation) with Austria (1938), destruction of the Czechoslovak state (1939), negotiation of a nonaggression pact with the Soviet Union containing a secret agreement to partition Poland, and, in consequence of that pact, the invasion of Poland on Sept. 1, 1939, which precipitated World War II.

Hitler boasted that National Socialism had solved the problems of German society and

NATIONAL TEMPERANCE LEAGUE, INC.

would endure for a thousand years. That the party had resolved problems with which the Weimar Republic was powerless to cope, for example, the centralization of the state and of industry, and that they transformed the weak Weimar Republic into an industrially and politically powerful state is a matter of record. Equally of record is the undeniable fact that the stupendous cost of that transformation included the holocaust of World War II, the bloodiest and most destructive conflict in human history, from which Germany emerged beaten, divided, and impoverished. Also included in that cost is the price paid in suffering endured by the German people under Hitler and after his death.

See separate articles on those persons whose birth and death dates are not given. C.J.F.

NATIONAL TEMPERANCE LEAGUE, INC. See AMERICAN COUNCIL ON ALCOHOL PROBLEMS.

NATIONAL URBAN LEAGUE, interracial, nonprofit, nonpartisan community service organization which uses the tools of social work, economics, law, and other disciplines to secure equal opportunities in all sectors of society for black Americans and other minorities.

Organized in 1910 by Northern black and white social workers and philanthropists, the league was originally called the National League on Urban Conditions Among Negroes. Its aims were to help black migrants from the rural South find jobs and housing, acquire more education, and adjust to an urban environment.

The league works in the areas of job development and employment, housing, health, education, law and consumer affairs, citizenship education, and military and veterans' affairs. It intervenes in the social and economic structure where the interests of Blacks, other racial minorities, and the poor are concerned. In 1968 the league adopted as its highest priority the training of ghetto community groups for political, social, and economic autonomy.

An interracial board of trustees headed by a president governs the league; the board appoints a paid executive director to implement its policy decisions. The executive director is Vernon E. Jordan, Jr. (1935–), who in 1972 succeeded the late Whitney M. Young, Jr. (q.v.), who had been executive director from 1961–71.

On the local level, the league has 101 affiliates located in thirty-four States and the District of Columbia which adapt the national program to their community needs. Five regional offices link the branches with the national office in New York City. The regional offices are located in New York City, Akron, Ohio, St. Louis, Mo., Los Angeles, Calif., and Atlanta, Ga. A profes-

sional staff of more than 2000 persons, supplemented by some 25,000 volunteers, carries on the league's work.

The league depends upon contributions and grants from individuals, corporations, foundations, labor unions, and religious groups. It also accepts contracts from the Federal government for specific projects.

See also NEGROES IN THE UNITED STATES; NEGRO ORGANIZATIONS IN THE UNITED STATES.

NATIONAL WAR COLLEGE, THE, military institution situated in Washington, D.C., under the supervision of the Joint Chiefs of Staff; see DEFENSE, DEPARTMENT OF. Founded in 1900 as the Army War College, the institution was reorganized under its present name during the unification of the armed forces following World War II. Its purpose is the training of selected officers of the United States Army, Navy, and Air Force and of the state and other executive departments for joint-staff and command duties in the interest of national security. Almost half of the academic year is devoted to the study of international relations and world affairs, U.S. commitments and responsibilities abroad, and the formulation and implementation of foreign policy. The remainder is devoted to the study of overall strategy, the strategic areas of the world, scientific and technological advances, and logistics. In 1973 the college library houses more than 250,000 books, papers, and documents. About 140 officers and civilians are enrolled annually. **NATIONAL WEATHER SERVICE.** See WEATHER SERVICE, NATIONAL.

NATIONAL WOMAN'S CHRISTIAN TEMPERANCE UNION, popularly called the W.C.T.U., organization founded in Cleveland, Ohio, in 1874 for promoting total abstinence from alcoholic beverages and abolishing traffic in such beverages. The organization had its genesis in the Women's Temperance Crusade (1873–74), when bands of hymn-singing women invaded saloons to stop the sale of liquor.

The W.C.T.U. has local branches in each of the fifty States and Puerto Rico; membership in the mid-1960's was about 275,000. Members must pledge total abstinence.

The union sponsors four organizations for young groups that range in age from preschool children to young adults. They are: the White Ribbon Recruits; the Loyal Temperance Legion; the Youth Temperance Council; and the Iota Sigma W.C.T.U. A publishing house, a historical museum, and a library for research on alcohol are maintained in Evanston, Ill., the site of national headquarters. In 1919 the organization was influential in securing national prohibition

and woman suffrage (qq.v.). In addition to its temperance program, the W.C.T.U. works for the abolition of narcotics traffic, the welfare of women and children, and world peace. Official publications are *The Union Signal* and *The Young Crusader*, both monthlies. The W.C.T.U. maintains a legislative office in Washington, D.C.

The organization is a member of the World's Woman's Christian Temperance Union, founded in 1883 by the American educator and reformer Frances Elizabeth Willard (q.v.), comprised of temperance groups for women in more than seventy countries. International headquarters are in London, England. See TEMPERANCE.

NATIONAL ZOOLOGICAL PARK. See ZOOLOGICAL GARDENS.

NATIVITY, THE, birth of Christ (see JESUS CHRIST) and an annual Christian festival celebrating it; see CHRISTMAS; FESTIVALS AND FEASTS: *Christian Festivals*. The birth of Christ is a favorite subject in most periods of Christian art. It was used occasionally in early Christian sarcophagi (see CHRISTIAN ART, EARLY: *Sculpture*), but came into fullest popularity in the revival of the arts during the 13th and 14th centuries, when it was painted by most of the Renaissance masters (see RENAISSANCE ART AND ARCHITECTURE).

NATO. See NORTH ATLANTIC TREATY ORGANIZATION.

NATTA, Giulio (1903–79), Italian chemist, born in Imperia, and educated at the University of Genoa and the Polytechnic Institute of Milan. After receiving a Ph.D. degree in 1924, Natta taught chemistry at the Polytechnic Institute and at the universities of Pavia, Rome, and Turin. In 1938 he returned to the Polytechnic Institute as director of the Industrial Chemistry Research Center. He shared the 1963 Nobel Prize in chemistry with the German chemist Karl Ziegler (q.v.). Both chemists were cited for their development of plastics and other synthetic chemicals of commercial importance. Natta's discovery in 1954 of polypropylene (one of a family of huge molecules) and his development of practical methods for the production of plastics revolutionized the industry.

NATURAL BRIDGE, limestone formation, in Rockbridge County, Va., over Cedar Creek. One of the natural wonders of the United States, it is 215 ft. high and has a span of 90 ft. at its broadest part.

NATURAL BRIDGES NATIONAL MONUMENT, area of natural interest in s.e. Utah, in San Juan Co., containing three natural bridges carved from sandstone. Sipapu Bridge, the larg-

est of the three, is 222 ft. high and has a span of 261 ft. Nearby is the Kachina Bridge, 205 ft. high with a span of 186 ft. The smallest of the bridges, the Owachoma Bridge, has a height of 108 ft. and a span of 194 ft. In the precipitous canyon walls are the ruins of several prehistoric cliff dwellings. The monument is administered by the National Park Service (q.v.).

NATURAL CHILDBIRTH. See OBSTETRICS.

NATURAL GAS. See GAS: *Natural Gas*.

NATURALISM, term employed in philosophy, religion, and the arts including literature.

In philosophy, naturalism denotes a doctrine based on natural law (q.v.). The term has been used variously, depending on a particular philosopher's concept of nature. Thus the French philosopher Jean Jacques Rousseau (q.v.) meant by naturalism a way of life opposed to the artificial or the traditional, and the English philosopher John Locke (q.v.) used it to signify original or fundamental knowledge, as opposed to the product of human reason. In modern usage the term designates the theory that cause-and-effect relationships, as in physics and chemistry, are sufficient to account for all phenomena and that teleological conceptions and metaphysical necessity, while not necessarily invalid, must be excluded from consideration. See MATERIALISM; REALISM.

The term is sometimes used to describe religious beliefs based on a sense of man's interrelationship with nature; see RELIGION: *The Primitive Religions*. In Christian theology, naturalism refers to human experience and to events in time and history.

In literature, the theory of naturalism holds that literary composition should be based on an objective, empirical presentation of natural man. Naturalistic writers regard human behavior as controlled by instinct, emotion, or social and economic conditions, and reject free will, adopting instead, in large measure, the biological determinism of the British naturalist Charles Darwin (see *under* DARWIN) and the economic determinism of the German revolutionist Karl Marx (q.v.). In this combined determinism, naturalism differs from realism in adding an amoral attitude to the objective presentation of life. Naturalism was first prominently exhibited in the writings of 19th-century French authors, especially Edmond Louis Antoine de Goncourt, his brother Jules Alfred Huot de Goncourt, and Émile Zola. Among its modern American exponents are Sherwood Anderson, John Dos Passos, Theodore Dreiser, and James Thomas Farrell (qq.v.). The naturalistic movement in the graphic arts was anticipated by the Dutch paint-



A group of aliens, including four members of the U.S. Marine Corps, take the oath of naturalization to become American citizens.
U.S. Immigration and Naturalization Service

ers of the 17th century and became generally dominant in European art from about 1840 to about 1860; see Art: *The Modern Era*; DUTCH PAINTING.

NATURALIZATION, process by which a state confers its citizenship or nationality upon a foreigner. The United States confers all the privileges of citizenship, except eligibility to the Presidency and Vice-Presidency. The Federal government has exclusive right to grant naturalization to aliens, through Federal or State courts. Under the law (effective Dec. 24, 1952), an applicant for U.S. citizenship must generally file a petition for naturalization in a naturalization court in the district wherein he is a resident. Formerly he was required to file a declaration of intention ("first paper"), but under current law the declaration is optional. The petitioner must be at least eighteen years of age and of good moral character. He must have been a lawful resident of the U.S. for at least five years immediately preceding the date of filing his petition for naturalization and a resident of the State in which he filed his petition for the preceding six months. He must have been physically present in the U.S. for at least two-and-one-half years of this five-year period. The residence requirement for spouses of U.S. citizens is three years. Special regulations also govern the naturalization of spouses of U.S. citizens who are employed abroad and alien veterans of the armed services. The petitioner is required to read, write, and speak English, unless prevented by physical disability or unless he was, on Dec. 24, 1952, over fifty years of age and a resident of the U.S. for twenty years. He must also be "attached to the principles of the Constitution of the United States" and have a knowledge of U.S. history and government. The petition for naturalization must be signed by the applicant and must be attested by two credible witnesses, citizens of the

U.S., who are personally acquainted with him. Generally a period of thirty days from the date of filing must elapse before the final hearing on the petition is held. When the petition for naturalization is granted by the court, the applicant swears allegiance to the U.S. and renounces allegiance to the foreign country of which he was formerly a citizen.

With certain exceptions, persons who within ten years of the time of the filing of their petitions for naturalization have been supporters of a totalitarian form of government, or who do not believe in organized government, are denied naturalization on the grounds of subversion. All racial barriers to naturalization were legally abolished in 1952. Women have equal rights to naturalization with men.

NATURAL LAW or NATURAL RIGHTS, in the history of jurisprudence (q.v.) rules governing human conduct and the rights of individuals discoverable by man's rational intelligence, in contrast to the body of positive or enacted law. The phrase has been used in several senses in different periods of the world's history. The Greek philosopher Aristotle (q.v.) conceived of law as a combination of natural law, which was the law dictated by God and common to all mankind, and man-made law. The Stoic philosophers believed natural law to be simply a body of law founded on reason; see STOICISM. By the Roman philosophers the term natural law, or *jus naturale* or *naturae*, was originally identified with universal law, or *jus gentium*, that part of Roman law which was common to all nations. Later Roman jurists distinguished *jus naturale* from *jus gentium*. Ulpianus (170?-228) defined natural law as "that which nature has taught all living things", and in the administration of Roman law (q.v.) judgments were often justified solely on the basis of natural law. During the Middle Ages natural law came to be identified

by leading theologians with the law of God as handed down in the Bible. In the 17th and 18th centuries, discussion and development of the law of nature were of particular importance in the development of the fields of international law, ethics, politics and economics (qq.v.). The natural rights of life, liberty, and the pursuit of happiness claimed under the theory of natural law played an important part in the American and French revolutions (qq.v.).

NATURAL SELECTION, in biology, the process by which environmental effects lead to varying degrees of reproductive success among individuals of a population of organisms with different hereditary characters, or traits. The characters that inhibit reproductive success decrease in frequency from generation to generation. The resulting increase in the proportion of reproductively successful individuals usually enhances the adaption of the population to its environment. Natural selection thus tends to promote adaptation (q.v.) by maintaining favorable adaptations in a constant environment (stabilizing selection) or improving adaptation in a direction appropriate to environmental changes (directional selection). Charles Darwin and Alfred Wallace (qq.v.) first proposed this concept in 1858. See EVOLUTION; HEREDITY; SEXUAL SELECTION; VARIATION. J.W.V.

NATURE WORSHIP, religious devotion paid either to nature as a deified collective entity or to all things in nature, including the elements, celestial bodies, plants, animals, and man. The worship of the elements does not seem to occur in the most rudimentary religions but frequently arises in later stages of religious development; see also MYTHOLOGY; RELIGION: *The Primitive Religions*. The worship of fire (see FIRE WORSHIP), found among many primitive peoples, reached its highest development in the ancient Parsee sect (see PARSEES) of Persia. Celestial bodies have been deified in the religious systems of primitive and highly civilized peoples alike. The Hot-tentots (q.v.) of South Africa worship the moon; sun worship (q.v.) was practiced by the Iroquois, the Plains Indians (qq.v.), and the Chimmesyan Indians of North America and reached a high state of development among the Indians of Mexico and Peru. The sun was also a Hindu deity (see HINDUISM), regarded as maleficent by the Dravidians (see DRAVIDIAN) of southern India, but considered benevolent by the Munda of the central parts. The Babylonians were sun worshippers (see BABYLONIAN RELIGION), and in ancient Persia worship of the sun was an integral part of the elaborate cult of Mithras (q.v.). The ancient Egyptians worshipped the sun god Ra;

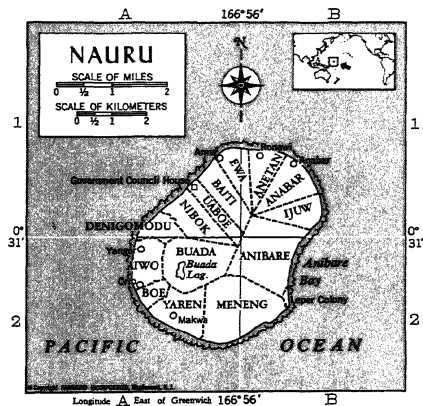
they also apotheosized the moon and the star Sirius (q.v.); see EGYPTIAN RELIGION. Other Egyptian deities included the constellations and the circumpolar stars; see ZODIAC.

Plants and trees have been worshiped as totems (see TOTEMISM) or because of their usefulness, beauty, or fear-inspiring aspect. They are considered either as holy in themselves or as the dwelling places of spirits. The soma plant of India and the coca shrub of Peru both have been worshiped for the intoxicating properties of products derived from them. Field crops, regarded as harboring spirits of fertility, have been worshiped both by primitive tribesmen and by the peasants of Europe, among whom traces of the cult may still be found.

See ANIMISM; FETISHISM; GREEK RELIGION AND MYTHOLOGY; INDIAN MYTHOLOGY.

NAUGATUCK, borough of Connecticut, in New Haven Co., on the Naugatuck R. near Waterbury. The borough produces iron, metal, plastic, and rubber products. Settled in 1702, it was chartered as a town in 1844 and as a borough in 1893. Pop. (1970) 23,034.

NAURU, republic in the central Pacific Ocean, situated at about half a degree below the equator, at long. 166°55' E. It is a raised, coral island,



INDEX TO MAP OF NAURU

Districts

Ajiwo	.....A 2
Anabar	.....B 1
Anetan	.....B 1
Anibare	.....B 2
Baiti	.....A 1
Boe	.....A 2
Buada	.....A 2
Denigomodu	.....A 1
Ewa	.....A 1
Ijuw	.....B 1
Meneng	.....A 2
Nibok	.....A 1
UaboeA 1
YarenA 2

Cities and Towns

AnabarB 1
AnnaA 1
MakwaA 2
OrtoA 2
RonawiB 1
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Physical Features

Anibare (bay)B 2
Buada (lagoon)A 2
Government Council HouseA 1
Leper Colony	.....B 2

NAUSICAA

about 3.5 mi. long and 2.5 mi. wide, with a circumference of 12 mi. and an area of 8.2 sq.mi. The population is 6768 (1972 est.), comprising 3471 Nauruans, 1787 other islanders, 883 Chinese, and 627 Europeans. The Nauruans are of mixed Polynesian, Micronesian, and Melanesian origin. The majority of the people have adopted Christianity. English is the official language, but it is taught in the schools as a second language. The Nauruan language continues to be spoken in the villages. Most of the people live along a narrow, fertile coastal strip that entirely encircles the island. The rest of the island consists of a central plateau about 100 ft. in elevation, which contains rich deposits of phosphate of lime. About 1,500,000 tons of phosphate are exported annually to Australia, New Zealand, and Great Britain, for use in the manufacture of fertilizer. The phosphate is treated and exported from Yangor, the chief settlement, under the control of the British Phosphate Commission. The Nauruans receive royalties for the mined phosphate. The people have benefited greatly from the wealth thus accumulated. They pay no income tax, and all medical services are free. Nauruans have a per capita annual income in excess of \$4000, one of the highest in the world. Because the phosphate will be mined out by the end of the century, plans have been discussed to relocate about 2500 Nauruans as a community in or near Australia.

Nauru was discovered by the British in 1798, annexed by the Germans in 1888, and surrendered to Australian armed forces in 1914. The island was occupied by the Japanese from 1942 until 1945, and in 1947 was placed under United Nations trusteeship, administered jointly by Australia, New Zealand, and Great Britain. Nauru gained its independence and was proclaimed a republic on Jan. 31, 1968.

NAUSICAA, in Greek mythology, daughter of Alcinoüs (q.v.), King of the Phaeacians, and his wife Arete. She found the Greek hero Odysseus (see *ULYSSES*) when he was shipwrecked on the shore of her father's kingdom. She then gave him clothing and directed him to the palace, where he was treated with great hospitality. See *ODYSSEY*.

NAUTILUS. See *CEPHALOPODA*.

NAUTILUS, U.S.S. See *SUBMARINE*.

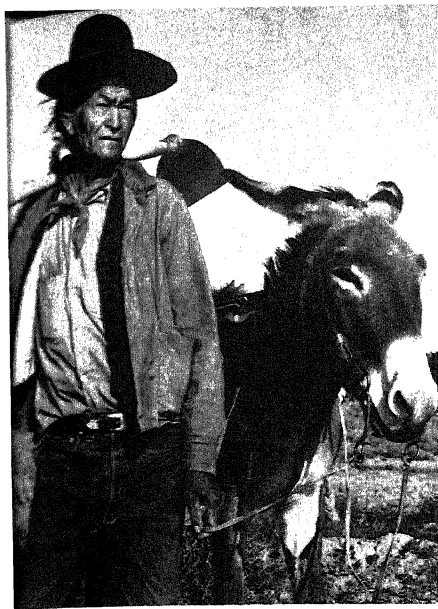
NAVAHO or **NAVAJO**, tribe of North American Indians of Athapaskan (q.v.) stock, living on reservations in northeastern Arizona and contiguous parts of New Mexico and Utah. They are closely related to the Apache (q.v.) and originally emigrated from areas north of their present habitat. A roving and predatory people, they

settled in the southwest during the 16th and 17th centuries. By about 1700 they had become a pastoral people. They presently live in close contact with the Pueblo Indians (q.v.) and have adopted a number of Pueblo arts, including weaving.

Navaho economy is based on the sustenance provided by herds of sheep and goats, some cattle and horses, and wage employment of various types on and off the reservations. To a limited extent, the Navaho are also agricultural. They make some pottery and baskets and are well known for their silver jewelry and fine, durable blankets. Unlike the Pueblo, who are sedentary and live in masonry or adobe houses, the Navaho rove in family groups, seeking pasturage and water supply for their flocks. Most frequently in summer but also in winter they build and live in hogans, conical houses of logs covered with earth, which have a smoke hole at the top and are entered through a short, covered passage. They often camp, however, with only a stone wall or a brush shelter to protect them from the wind. The tribe is divided into more than fifty clans, and descent is traced in the female line.

The Navaho religion includes the worship of the winds and watercourses and of a number of gods who are believed to intervene occasionally in human affairs. These gods are frequently invoked; offerings are made to them, and ceremonial dances are performed in which they are represented by painted and masked men. Songs, chants, prayers, and sand paintings also form part of the complicated religious rituals. A large body of mythology exists, which includes a story tracing the origin of the tribe from the goddess Esdzanadlehi, or Changing Woman.

The Navaho came into frequent conflict with the Spanish colonists and Mexicans during the 18th and early 19th centuries. In 1846 they made their first treaty with the United States government, but soon became hostile and engaged in chronic warfare with Americans until 1863. In that year and subsequently, more than half of the tribe was forcibly deported to a reservation in New Mexico, where they suffered severe hardships from disease, crop failures, and attacks by other tribes. A new treaty was signed in 1868, under which the captives, then numbering about 7300, were returned to a reservation set aside in their former territory and were provided with sheep and cattle. In 1884 the reservation was extended to accommodate their increasing herds. Navaho reservation lands total more than 15,000,000 acres; the tribe was estimated to number nearly 140,000 in 1973. The



A Navajo farmer and his burro in northern Arizona.

Western Ways

Navaho capital is located at Window Rock, Ariz.

See also AMERICAN INDIANS: *Southwest Area*.

C.K. & M.H.R.

NAVAJO NATIONAL MONUMENT, area of historic interest in N.E. Arizona, within the Navajo Indian Reservation, about 60 miles N.E. of Tuba City. The monument preserves three separate areas of prehistoric Indian cliff dwellings, built in the 12th and 13th centuries. The largest of the cliff dwellings, in the Keet Seel area, is situated in the walls of a branch of Tsegi Canyon and contains more than 150 well-preserved rooms and ceremonial chambers. The ruin in the Betatakin area, in another branch of Tsegi Canyon, is the most accessible of the cliff dwellings; it contains almost 150 rooms. Inscription House, the smallest of the cliff dwellings, is in Nitsie Canyon, and contains 67 rooms. The monument is administered by the National Park Service (q.v.).

NAVAL ACADEMY, UNITED STATES. See UNITED STATES NAVAL ACADEMY.

NAVAL ARCHITECTURE or **MARINE ARCHITECTURE**, art and science of designing boats and ships, see **BOAT**; **BOATBUILDING**; **SHIPS** and **SHIPBUILDING**. Ship design may be accomplished in various ways. The oldest and most primitive method is to design the hull, or body, of the ship while building it; the keel (the central longitudinal timber to which the ribs are attached), stem (the timber at the front to which the sides

NAVAL ARCHITECTURE

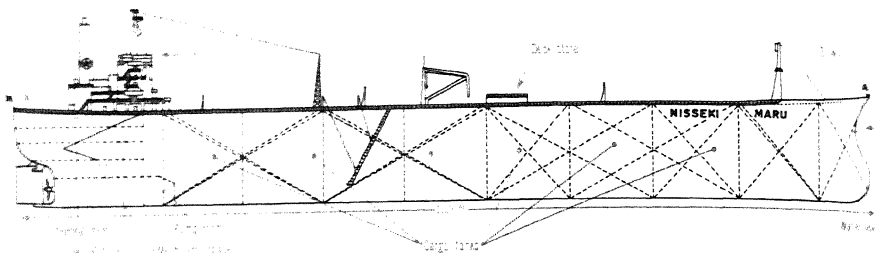
are joined), and the stern (the rear end of the ship) are shaped and set up, then the midship frame (the frame at the widest part) is formed and set up on the keel. Battens, which are thin strips of wood, are then bent the length of the hull, three or more to the side and, by means of shores and struts (braces), are sprung to the curves selected by the designer. The remaining frames are fitted inside the battens to establish the final shape of the hull. Primitive bark and skin boats are formed by shaping the gunwales, the top edge of the sides of the boat, and spreading them amidships to the desired beam (width) of hull; the rest of the hull is formed by the shape given the frames or ribs in bending and fitting them and by the profile shapes of bow and stern. The dugout, another primitive type, is shaped by the builder while hewing the log into canoe or boat form.

HISTORY

The use of scale models in the design of ships probably is very ancient. Some authorities believe that models were used for this purpose as early as 500 B.C.

Models and Half-Models. The galleys of the ancient Greeks and Romans may have been designed in this manner. Eventually the complete model was replaced by the half-model, which represents one side of the hull. Because both sides of the hull are identical, the half-model provides all the required frame shapes. At first the half-model was made of a solid block of wood, shaped by the designer to his satisfaction. The model was mounted on a plank and sawed transversely at selected positions; the shape of the section at each saw cut then could be traced on a piece of paper or thin wood. Each saw cut, or station, represented a mold frame which, when scaled to full size, formed, and set up on the keel, controlled the form of the finished hull. It is not known with certainty when the half-model originated, but it was earlier than 1727.

In the late 18th century the so-called hawk-nest model was popular. It consisted of a backboard, or base, shaped like the desired profile of the hull or marked to show the profile. The mold stations were marked on the backboard and thin planks formed to the desired shapes were erected at these stations. The model was held in shape by battens bent lengthwise over the mold stations. The stern was shaped by a formed block. The battens proved, or verified, the model, showing it to be fair, that is, so shaped that it could be planked; the plank must bend naturally and still be in contact with each mold frame.



General structural arrangement of the mammoth Japanese-built tanker Nisseki Maru.

Late in the 18th century, designers began to make models by fastening planks together temporarily to form the block from which the hull was shaped. These planks were thin and so placed that when they were separated after the model was formed, they became horizontal sections of the hull. By marking the frame stations on each plank, or "lift", the cross sections could be established at each frame. This form of half-model was called a "lift model".

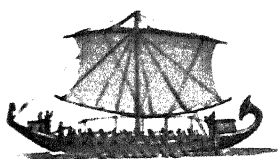
The use of the half-model in boat and ship design was very popular throughout the 19th century and is still popular in many parts of the world. The model enables the designer to visualize the hull form in three dimensions and to see, in general shape, the hull exactly as it would appear in the finished vessel or boat. The shape of a hull can be judged more easily from the model than from plans; it is for this reason that the half-model is still in use as a guide in design.

Scale Drawings. The use of scale drawings in the design of ships and boats was common at least as early as the 15th century. By the end of that century the mode of projection and the methods of establishing mold sections and profile were well established. In general, the sections were formed of arcs of varying radii controlled by arbitrarily established longitudinal curves on which the arc radii would fall. The methods employed appear to have been developed by the Venetians, then notably advanced ship designers and builders. The method they employed was adopted in England sometime before 1550 and probably was employed in France and Spain somewhat earlier.

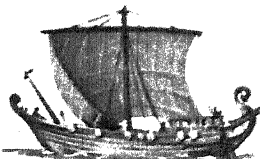
Prior to the 15th century the design of ships and boats by means of models or scale drawings was controlled by generally accepted proportions of depth and width to length for given classes of vessels and small craft. To a very great extent, the hull form was the result of the judgment and the artistic sense of the designer.

Toward the close of the 15th century marked improvements were made in the mode of designing ships by means of scale drawings, and attempts were made in Venice and Genoa to calculate displacement. These methods were introduced into England in the 16th century, as shown in *Fragments of English Shipwrightly*, a treatise assigned commonly to 1586 or thereabouts. Another treatise on ship design was prepared in England in 1625, and the English shipbuilder Sir Anthony Deane (1638?–1721) wrote a paper on ship design in the last quarter of the 17th century. Although these treatises contained some examples of the use of mathematics (q.v.), most of the calculations dealt with hull proportions and problems related to forming the sections of the hull. According to a contemporary observer, Deane demonstrated displacement calculations in 1666. The design methods described, however, were predominantly in the field of art rather than of science.

Calculation. The development of calculations for guidance in ship and boat design did not proceed steadily; in the early 17th century the science apparently remained nearly static. During the last quarter of that century interest was renewed in calculations required for marine architecture, particularly in France. The French applied mathematics to problems of ship performance, for example, to determine the best course a sailing ship should follow with wind on and forward of the beam. *L'Architecture Navale*, however, published in Paris in 1677, was a practical shipbuilder's book without references to the use of calculations in marine architecture. At conferences held in Paris in 1681 mathematicians attempted to analyze the principles of ship form, the objective being, apparently, to establish mathematical rules for the design of ships. In 1697 the French marine architect Paul Hoste wrote *Théorie de la Construction des Vaisseaux* ("Theory of Ship Construction"), which gave much space to the use of mathematics in ship design with relation to displacement, stability, and sailing power. Hoste's work may be characterized as the first attempt to



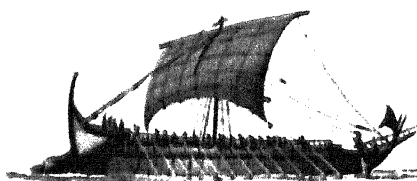
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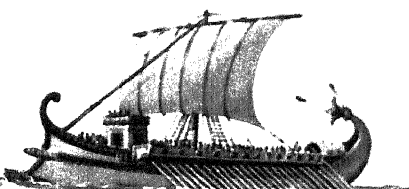
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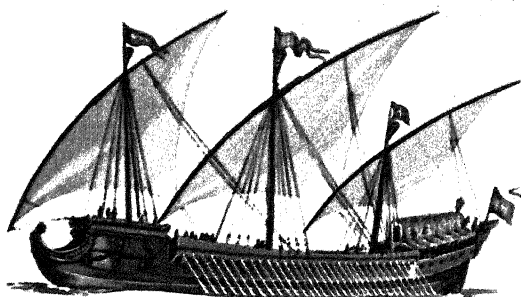
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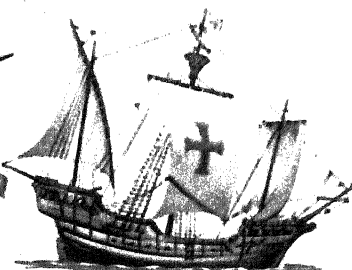
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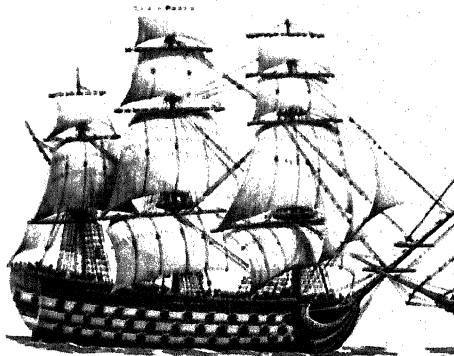
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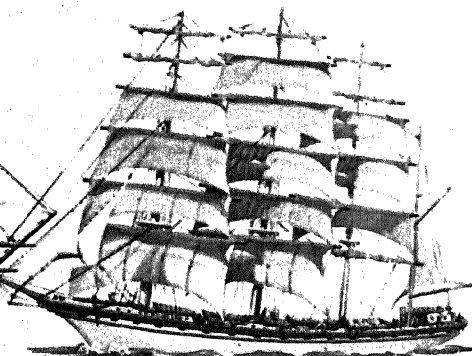
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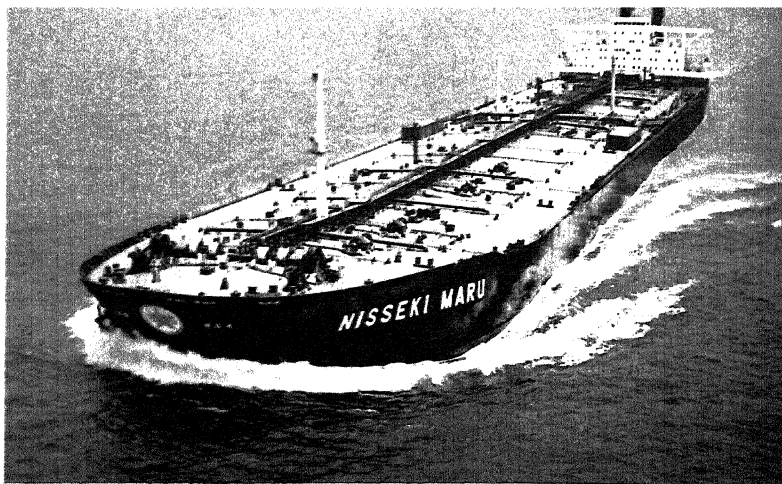


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Naval Architecture. Plate 1. The development of merchant and naval rowing and sailing ships. 1. Early Egyptian wooden craft, about 1500 B.C.; 2. Phoenician galley, about 700 B.C.; 3. Viking fighting galley, about 900 A.D.; 4. Large Greek rowing vessel, about 300 B.C.; 5. Roman galley, about 100 A.D.; 6. 17th-century galley; 7. 16th-century caravel; 8. Early 19th-century heavy frigate; 9. Fast late-19th century British clipper.



Tokyo Tanker Co., Ltd.

Naval Architecture. Plate 2. Above: The largest oil tanker currently in service, the 366,812-deadweight-ton Nisseki Maru, was launched in 1971. The mammoth ship is 1139 ft. long, 179 ft. wide, and as high as a 20-story building. The Nisseki Maru can carry almost 3,000,000 barrels of crude oil at 14.5 knots. Below: The most modern ocean liner on the transatlantic route, the British-built Queen Elizabeth II, is seen here entering New York Harbor. The 68,863-deadweight-ton luxury liner can carry 2025 passengers, is 963 ft. long and 105 ft. wide, and has a service speed of 28½ knots.

Cunard Line



apply theory and mathematics to ship design.

In the process of applying calculations to ship design various theorists soon became interested in the problem of resistance (retardation of a ship by water); and attempts were made to determine the relationship of this force to hull design, notably by the Dutch mathematician Christian Huygens (q.v.) and the Swiss mathematician Jakob Bernoulli (see under BERNOULLI). Controversy arose as the subject was examined. Also the theorists as well as practical ship designers disagreed, not only on problems involving resistance, but on the principles underlying stability, steering and sailing qualities, and displacement.

During the century following 1680 a large number of European theorists wrote on the use of mathematics in ship design. Most of them approached the subject with the objective of establishing mathematical formulas that would govern all ship design. In the same period a few shipbuilders also wrote on ship design, but they were concerned usually with practical methods of design and construction without reference to mathematical theory. The Swedish naval constructor Frederick Henrik Chapman (1721–1808), whose writing began to appear in 1768, was the first to relate theory to actual practice. His chief work, a general treatise on the design of ships, remained influential until as late as 1839, when a French translation was published; the English translation was published in 1817.

By 1800 the projections that are now considered necessary in drawing the hull form of a ship or boat were known widely, and drafting skill was very great. Drafts of basic plans, lines, construction section, deck framing, inboard works, spars, and sails were in use, and the art of "lofting" the lines plan, that is, drawing it full size in the mold loft to produce the patterns from which the frame shapes were cut, also was far developed. A skilled builder could produce a vessel with great accuracy from either a scale drawing or a half-model. The marked increase in precision in making scale drawings or models gave greater precision in calculations, for the measurements to scale from the drawings or model were accurate for the full-size ship.

Calculations in this period rarely extended beyond estimating weight and determining displacement, center of lateral plane of the hull, and center of effort of the sails. Because the theoretical work necessary to determine resistance and stability was very laborious and time consuming, it was rarely employed in practical design.

In the 19th century the mathematical ele-

ments of marine architecture were studied intensively. The methods of calculation were improved, suitable instruments were developed, and, after 1820, a large number of experienced ship designers as well as theorists were engaged in research in this field. Numerous treatises on systems of design and upon science applied to shipbuilding appeared.

Predetermination of quantitative resistance in the design stage became highly desirable after steamships came into use, because in this way the power required to produce the desired speed could be established. The early steamers were usually underpowered and slow. In the United States, high-speed river steamers were needed to operate over long distances in smooth water. Given this requirement for smooth water, the builders of the Hudson-River steamers, engines, and boilers were able to increase speed from 5 to 7 m.p.h. in the period 1809 to 1814; to 20 m.p.h. by 1838. Nevertheless, the predetermination of power required to produce a given speed remained less a scientific calculation than an experienced guess.

Model Testing. The problem of estimating resistance in preliminary design had been attacked in another way in the 18th century. As early as 1670, the English designer Samuel Foretry (1622–81) carried out model tests, which he reported in *Of Navarchi*. Later, in 1721 the Swedish scientist Emanuel Swedenborg (q.v.) had proposed the use of towed scale models for this purpose. Subsequently other scientists, including the American Benjamin Franklin (q.v.) in 1764, experimented with towed models. The Society for the Improvement of Naval Architecture, formed in England in 1790, carried out extensive model testing in the Greenland Dock in London. About 1830 Alexander Hall and Company, of Aberdeen, Scotland, established a model-testing tank at its shipyard. The American engineer and inventor Robert Livingston Stevens (1787–1856) carried out sailing-model tests near New York City about that time and also experimented with steamship models. The British naval architect William Froude (1810–79) began testing models in 1862–63. Froude, who established the testing tank in Torquay, England, in 1870, developed model-testing procedures that are the foundations for modern methods and theories. The first American model-testing tank was established at the Washington Naval Shipyard in 1900.

During the last half of the 19th century the development of ship-design techniques was very rapid. The early theorists and the practical ship designers as well had been plagued by the

NAVAL GUNS

concept that there could be only one model, or hull shape, of minimum resistance. Marine architects slowly discarded that concept as they learned that the proper hull form, in proportion to the length of the hull, depends on the range of speed and quantity of power.

Model testing, although started in the period when sail was predominant, did not develop into an important branch of marine architecture until the design of steamships became competitive. Propulsion efficiency, as well as the resistance factor, became important, with the result that designers began to test model propellers and self-propelled models; see PROPELLER. Gradually models were employed to test structural stresses, maneuvering, turning, seaworthiness, wind resistance, and other factors.

Model testing has had much influence in modifying mathematical theory as well as practical design methods. Great effort has been expended to make precise determinations of the qualities of a ship or boat at the design stage, although at present this objective has not been reached completely. Nevertheless, many design problems can be solved with sufficient precision for most practical needs by the use of proper model-testing technique.

Mathematical investigation of the elements of hull design continues, but much of this research is carried out in conjunction with model testing, because experience has shown that testing may indicate the limitation of a purely mathematical approach.

Societies and Schools. Professional societies of naval architects and marine engineers began to appear in the last half of the 19th century. Besides providing a medium of distribution of scientific and practical information through publications and reports, these societies have encouraged research and advanced the science of marine architecture. The establishment in the 19th century of classification societies by marine-insurance associations led to extensive studies of structural problems in ship design and to research in that field. Schools and university departments of naval architecture also were founded in the 19th century. In addition to teaching practical and theoretical factors in ship design, these schools engage in research. Most schools of naval architecture have model-testing basins and equipment necessary for practical experiments in ship design. H.I.C.

NAVAL GUNS. See SHIPS, NAVAL.

NAVAL OBSERVATORY, observatory of the Federal government, under the jurisdiction of the Office of the Chief of Naval Operations of the Department of the Navy, situated in Wash-

ington, D.C. The observatory also maintains a time service substation at Richmond, Fla., an astronomical observatory at Flagstaff, Ariz., and transit-circle facilities in Washington and El Leoncitos, Argentina, which determine the positions of celestial bodies.

The primary purpose of the observatory is to insure safe ship and aircraft navigation; to this end continual observations of the planets and stars are maintained and navigational almanacs are published annually. Mathematical and instrumental research is conducted to improve the accuracy of the observations, the star catalogs, and the tables upon which the almanacs are based.

Special telescopes called photographic zenith tubes are used to determine time; the clocks used are electronic instruments. The Naval Observatory controls the time signals, which are transmitted by naval radio stations for use in navigation and scientific projects.

Photographs of sun spots are obtained by means of a photoheliograph with a focal length of 39 ft., and are used by other agencies to forecast conditions for radio reception. Long-range observational programs are conducted by means of conventional telescopes.

The observatory maintains one of the leading libraries on astronomy and mathematics in the United States. Calculations for the predicted positions of the sun, moon, planets and principal stars are reported in the *American Ephemeris and Nautical Almanac*, the *American Nautical Almanac*, and the *Air Almanac*. These volumes, which are published annually well in advance of the period covered, provide data for navigators, astronomers, surveyors, and others.

Originally named the Depot of Charts and Instruments, the Naval Observatory was temporarily established in 1830, and made permanent in 1842 by a Congressional enactment. The present name was adopted in 1845.

NAVARINO. See PILOS.

NAVARRÉ, former independent kingdom of Europe, mostly within the Pyrenees mountain chain, now constituting Navarra Province in Spain and part of Pyrenees-Atlantiques Department in France.

NAVIGATION, science of determining the position of a ship, aircraft, helicopter, or rocket, and charting a course for guiding the craft safely and expeditiously from one point to another; see AIRPLANE; AIRPORT AIRWAY; HELICOPTER; ROCKET; SHIPS AND SHIPBUILDING. Practice of navigation requires not only thorough knowledge of the science, but also considerable experience and judgment.

The science of navigation is divided into four principal techniques: (1) so-called dead reckoning (q.v.), which is derived from the phrase "deduced reckoning", and estimates the approximate position of a ship solely from its course and speed through the water; (2) piloting, which involves guiding the ship in the vicinity of dangers, such as shoals and narrow waters, by frequent reference to geographical landmarks and navigational aids and by use of sounding (q.v.); (3) celestial navigation, which utilizes the observation of celestial bodies to determine position on the surface of the earth; (4) electronic navigation, the most important and advanced system of navigation today, using radio and electronic equipment.

Position and Direction on the Earth's Surface.

The basic problems of navigating any craft involve the determination of its position and direction and the measurement of speed, distance, and time in proceeding from one point to another. Position is a point on the earth's surface that can be recognized as part of an accepted set of coordinates, such as latitude and longitude (q.v.). Direction is the position of one place relative to another without reference to the distance between them, and is usually indicated as the angular distance, measured in degrees of arc, from the direction of true north. Speed is the rate of travel expressed in nautical miles per hour, and distance is the spatial length between two places without reference to the direction between them.

Map and Chart Projections. The initial planning and the end results of navigation are plotted on flat surfaces called maps and charts. The quasi-spherical surface of the earth is represented on a plane surface upon which are superimposed the coordinates of latitude and longitude and also the desired features of surface and underwater topography. Representations known as charts accentuate the determination of position, direction, and distance, and stress points of interest to a navigator. Because no part of a sphere can be spread out flat without distortion, several projections of charts have been developed to accommodate the navigator; see *MAP: Map Projections*. Each projection has its own advantages and limitations, and fulfills a specific need of the navigator.

The most universally used projection in navigation charts is the Mercator, named after the Flemish mathematician and geographer Gerhard Mercator (q.v.) who devised it. These charts portray the earth's sphere projected on a cylinder tangent to the surface of the earth at the equator. When this cylinder is flattened out, the

meridians or longitudes appear as equally spaced vertical lines and the parallels of latitude appear as parallel horizontal lines. The parallels of latitude are drawn farther apart toward the poles to compensate for the greater distortion in that direction for the meridians. The popularity of the Mercator projection, despite its great distortion, is because of the fact that lines, directions, and distances appear as straight lines and can be measured directly.

A navigator usually attempts to find the shortest route between two points; this can be accomplished by following the course known as great circle. The great circle between two points on the surface of the earth represents the arc of a plane intersecting the sphere at its center and is therefore the shortest path to be followed on a spherical surface. Great-circle courses can be determined directly from great-circle charts, but because it is impracticable for a ship to travel in an ever-changing course the usual practice is to follow a series of chords which approximate the great circle. These chords are normally plotted on a Mercator chart.

Most of the navigable waters of the world have been surveyed accurately by the hydrographic services of the principal maritime nations so that reliable charts are usually available to the navigator. For the wide expanses of oceans, where the navigator normally resorts to celestial navigation, he uses blank Mercator plotting sheets, showing only latitude and longitude lines. After performing his navigation plots on this sheet, the navigator transfers his plotted position to a regular chart.

The hydrographic services of various countries also publish almanacs and sailing directions to assist the navigator. Sailing directions are descriptive books containing detailed information on coastal waters, harbor facilities, navigation aids, winds, tides, currents, dangers to navigation, directions for approaching and entering restricted waters, and other data that cannot be shown on the chart of the area.

Navigation Instruments. Many instruments are employed today to facilitate navigation, some relatively simple to use and others requiring extensive programs of instruction. In the latter category are some of the modern electronic and mechanical devices.

Navigation instruments are designed to fix position, measure direction and distance, to determine speed, to measure the depth of water, to assist in plotting on charts, and to observe the weather elements. Sometimes a combination of various instruments is used simultaneously to yield the required information.

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The magnetic compass is one of the oldest instruments used aboard ships; see **COMPASS**. Although it has been generally supplanted by the gyrocompass on large ships, the magnetic compass retains its original role as the basic navigational instrument because it is not subject to electromechanical defects, and hence, on most seagoing ships it is a necessary standby instrument. The magnetic compass serves as a directional device by aligning itself in the direction of the earth's magnetic poles; see **TERRESTRIAL MAGNETISM**. Although subject to errors as a result of local magnetic effects in metallic ships and the changes in the earth's magnetic field, the readings can normally be corrected to adjust for these errors.

The gyrocompass, which utilizes a gyroscope (q.v.) as its directive element, tends to indicate true north. The gyroscope in this compass is a rapidly rotating mass, free to move about one or two axes, perpendicular to the axis of rotation and to each other. Control elements are added to the gyroscope to convert it to a true direction indicator. The indications of the master gyrocompass may be repeated in various parts of the ship, for example, in bearing repeaters, steering repeaters, and radar repeaters; see **RADAR**.

The azimuth circle is an important auxiliary device used for indicating azimuth, or the bearing of an object, its direction measured from the north point. It is a graduated ring with slight vanes which is designed to fit snugly over a compass or a compass repeater; it provides a means of taking bearings of both terrestrial objects and celestial bodies.

For taking bearings some vessels use a pelorus, which is a dummy compass card, usually graduated in degrees from 0° to 360°. This card lacks a directive element but is provided with sight vanes.

An instrument known as the log is used to determine either the speed of a ship or the distance traveled through the water, or both simultaneously. Various types of logs are used, some operating on a simple mechanical principle and others based upon ingenious electromechanical techniques. One of the latter, the pitot-static log, utilizes a pitot tube, a device that measures the difference in dynamic and static pressure to be measured as the ship moves through the water. By means of registering devices, this difference is then appropriately translated into terms of speed and distance.

To determine water depth a navigator uses either the lead or the echo sounder. The lead, which consists essentially of a lead weight at the end of a suitably marked line, is utilized in

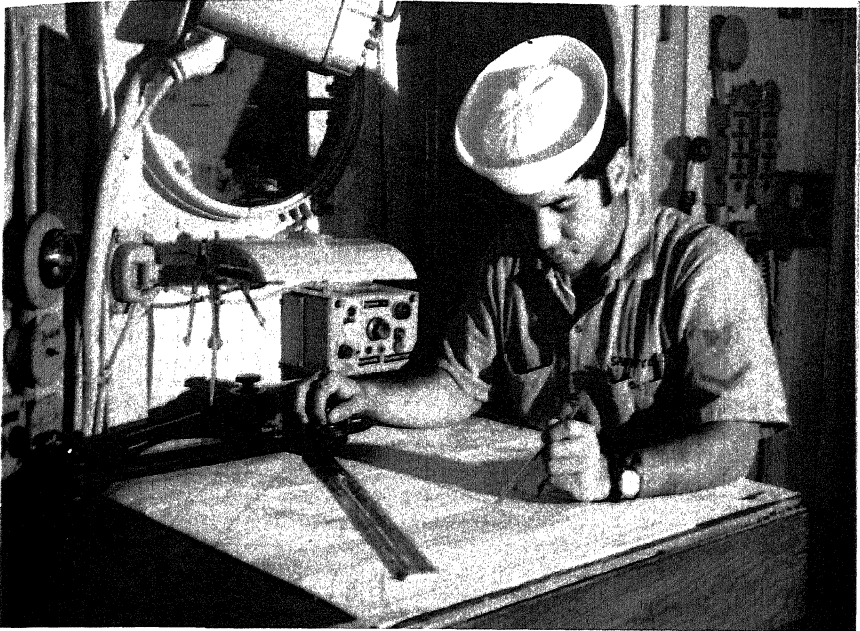
coastal or shallow waters under conditions of low visibility. The echo sounder, which is found on almost all seagoing ships, indicates the depth of water by measuring the time interval between the emission of a sonic or ultrasonic signal and the return of its echo from the bottom; see **ULTRASONICS**. This instrument may provide aural or visual soundings, either instantaneously on an indicator or continuously on a recorder. The recorder delineates the underwater contours and may be of invaluable assistance in coastal navigation.

The plotting equipment used by the navigator resembles to a certain extent the tools used by a draftsman. Dividers for measuring distances, compasses for drawing circles, plotters, protractors, and universal drafting machines are the rudimentary tools found commonly on the chart table of a ship.

For celestial navigation the navigator uses a sextant (q.v.) and a chronometer. The sextant is a double-reflecting instrument which measures the angle between two objects by bringing into coincidence rays of light received directly from one object and by reflection from the other. Its principal use is to determine the altitude of celestial bodies above the horizon. The chronometer is a very accurate timepiece with a nearly constant rate of daily gain or loss. It is set to the time of a standard meridian, usually that of the observatory of Greenwich, in London, England, and makes possible the determination of longitude at sea. Its daily rate of gain or loss is checked by radio time signal broadcasts from various countries. See **CLOCKS AND WATCHES: Precision Timepieces**.

In addition to these instruments, most modern ships use several electronic navigation devices; see **Electronic Navigation**, below.

Navigation in Pilotage Waters. Piloting is the most exacting form of navigation because it entails the movement of ships under many potentially dangerous conditions. The greatest care and exactness is necessary for success in piloting, especially in poorly charted coastal waters or under unfavorable conditions of weather and visibility. One of the chief concerns of the navigator in pilotage waters, where traffic is heavier than at sea, is to avoid collision with other ships. **LINE OF POSITION.** A basic concept in piloting is known as the line of position, a line indicating a series of possible positions of a craft and determined usually by observation. One line of position is not sufficient to determine the exact position of a ship. The point of intersection of two or more lines of position, taken simultaneously or adjusted for time lapse, is a positive position



A U.S. Navy quartermaster plots a course on a chart, using a compass and a drafting machine. New devices are constantly being introduced to perfect the art of navigation, one of the latest being a computer-assisted navigation system. Basic data are fed into the computer, and the machine recommends an appropriate course.

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known as a fix. The navigator in pilotage waters strives constantly to arrive at such intersections of lines. Fixes then serve as reliable guideposts for future movements of decisions.

Visual piloting is accomplished generally by employing an azimuth circle on a gyrocompass repeater to take bearings of identifiable and charted objects. These bearings then are plotted on a chart of the area to indicate graphically the position of the ship. A single navigational object may define a fix if both a bearing and a range can be taken simultaneously by the use of a range finder in addition to the azimuth circle, or by radar. In cases where only one line of position is available without an accompanying range, the navigator must resort to the use of the so-called estimated position, which is not as reliable as a fix but is more reliable than a dead-reckoning position. An estimated position requires continued extra caution in the navigation processes until a fix is determined.

A line of position may be obtained by several methods. The line may be straight, curved, or irregular, such as a line produced by plotting a series of soundings taken over a period of time. A line of position may be obtained by any one of the following methods: a range within which two known fixed objects appear in line, and the ship is placed somewhere on this line; a com-

pass bearing of an object observed visually or by radar; a range by range finder or by radar; a single sounding or a series of soundings of the bottom (usually referred to as a chain of soundings); a horizontal angle, measured by a sextant, between two known objects; a vertical angle, measured by a sextant, of an object of known height; an echo of the ship's whistle or siren; the use of synchronous radio and sound transmissions from a known fixed object; a radio direction-finder bearing; lines of position derived from one of several electronic systems; and astronomical lines of position.

FIXING THE POSITION. Any combination of these methods of determining a line of positions permits fixing the position of a ship. Fixes may be arrived at by cross bearings, by a bearing and distance of the same object, by a bearing and a sounding taken simultaneously, by horizontal sextant angles, and by two bearings of a single object taken at different time intervals but adjusted for time lapse when plotted. The last-mentioned technique is known as a running fix.

In addition to these graphic methods, a ship's position can be deduced by the use of horizontal angles in conjunction with a three-arm protractor. Such a protractor consists of a circle, graduated in degrees, to which is attached one fixed arm and two arms pivoted at the center. If horizontal angles taken on three identifiable fixed objects shown on a chart are set on the protractor and the latter is positioned on the chart with the objects lined up on the three arms, the position of the ship is fixed at the center.

PILOTING AIDS. Every maritime country has established various standard types of aids to navigation. The primary objective of such aids is to facilitate navigation in pilotage waters. Electronic aids, however, may be designed for use both in piloting and in long-range navigation. Aid to navigation may consist of various types of buoys, lighthouses, and light vessels, with characteristic shapes and colors providing significant daytime identification and characteristic phases and colors of lights providing identification at night; see **BUOY**; **LIGHTHOUSE**.

The navigator cannot rely solely on buoys and lights for navigation along long stretches of coast that are without such navigational aids. In these areas he must resort to taking bearings of mountain peaks and of charted structures such as watertanks or church spires, and taking tangent bearings of islands or points of land.

Tides, Tidal Streams, and Ocean Currents. The practice of navigation is complicated by the presence of tidal effects and ocean currents. These effects, which may be either favorable or unfavorable, tend to deflect the ship from its charted course and reduce or increase its speed. A comparison of dead-reckoning positions and fixes reveals the extent of such effects and often helps the navigator to predict and adjust for future influences.

TIDE. Tide is the periodic rise and fall of the surface of oceans, bays, and other bodies of water caused by the gravitational forces between the earth and the moon and, to a lesser extent, between the earth and the sun; see **TIDES**. This rise and fall of the surface of the sea causes an accompanying horizontal movement known as tidal current. The condition of the tide at a particular time and place often is a serious consideration to the navigator, especially when in pilotage waters. In entering and leaving port he must be aware of how much water is under the keel of his ship and whether it is sufficient to ensure safe passage. When sailing along coastlines it is necessary to predict the possible effects of tidal currents in setting the ship on or

off the shore. Tide and tidal-current tables based on accurate astronomical and hydrographic data are published yearly by the principal maritime countries. With these tables, the navigator can, with reasonable accuracy, predict tidal effects.

OCEAN CURRENTS. Ocean currents are relatively constant streams in the ocean, most of which have been accurately analyzed and charted. These currents are caused primarily by the prevailing winds of the world. For example, the equatorial currents are caused by the constancy of the trade winds; see **WIND**. Other factors influencing ocean currents include the difference in salinity and density of the water in two ocean areas, the difference in atmospheric pressure and temperature over two areas, and the underwater topography of the earth's crust. Although the extent of ocean-current effects usually is predictable from reliable current charts and publications, the navigator must be on the alert for possible changes; see **OCEAN AND OCEANOGRAPHY**.

Celestial Navigation. In this classic method, used most commonly in the open sea, the navigator utilizes celestial bodies that have been identified and grouped into constellations since ancient times; see **ASTRONOMY**. Celestial navigation makes possible voyages across thousands of miles of unmarked water but its one great limitation is that poor visibility, caused by clouds, fog, rain, snow, mist, or haze, may prevent the essential sightings of celestial bodies.

To a person on the earth's surface the sky appears as an inverted bowl with all celestial bodies situated on its inner surface. This celestial sphere, concentric with the earth, appears to rotate westward, for an observer on the earth is unaware of the earth's rotation. Thus the sun, the moon, the planets, and the stars appear to rise east of, and to set west of, the observer's meridian, or longitude.

A coordinate system of positions similar to the earth's coordinates of latitude and longitude has been adopted to describe the position of heavenly bodies on this sphere. This system consists of declination, which corresponds to terrestrial latitude, and hour angle, which corresponds to terrestrial longitude. For practical purposes of navigation the position of stars relative to each other are regarded as fixed in the classical sphere; the motion of the sun, moon, and planets is indicated as a mean rate of progression across the sphere.

The principal maritime nations publish yearly nautical almanacs which tabulate the coordinates of celestial bodies used in navigation at

any particular time. The tables also provide other pertinent astronomical information.

To utilize the nautical almanac the navigator must establish the time of an observation accurately by means of the chronometer. The measurement of time is based on the rotation of the earth and the consequent imaginary rotation of celestial bodies around the earth. In navigation the primary system of time is based upon the apparent movement of the sun westward at 15 degrees of longitude per hr. Thus, a time difference is established between two places on the surface of the earth based upon their difference of longitude. The longitude of New York City, for example, is roughly 75° W. and that of Greenwich, England, is 0°. New York is therefore 5 hr. to the west of Greenwich.

The navigational triangle, or astronomical triangle, which constitutes the most important part of celestial navigation, is a spherical triangle, the three points of which represent respectively the position of the observer, the geographical position of the celestial body, and the earth's pole that is nearest to the observer. The solution of such a triangle provides the basis for the derivation of an astronomical line of position. Spherical trigonometry was formerly required to solve such a problem, but this triangle can today be solved simply by using the nautical almanac in conjunction with one of several short tabular methods. The tabular methods include precomputed solutions of the astronomical triangle to accommodate any position of the observer and any celestial body observed.

In the most modern approach to celestial navigation the circle of equal altitude and the astronomical position line are used in conjunction with the solution of the navigational triangle. The circle of equal altitude is a circle on the surface of the earth, and at every point on this circle the altitude of a given celestial body is the same at a given instant.

The first step in utilizing celestial navigation is to predetermine an appropriate time for observations and what celestial bodies are visible at that time. The navigator next observes the altitude of a celestial body over the horizon with his sextant, noting the exact time of the observation. Then, by assuming an imaginary position close to his actual position, he solves the navigational triangle, using the imaginary position, the body observed, and the time noted. The solution provides the computed altitude of the body, which would be correct if he actually had been at that time at the imaginary position. The observed altitude, as taken with the sextant, usually does not agree with this computed alti-

tude, and hence the actual position of the ship must be on a different circle of equal altitude.

The difference between the observed and the computed altitudes is known as the intercept, and is expressed in nautical miles. Starting at the assumed position of the ship, the intercept is plotted either toward or away from the geographical position of the celestial body, depending upon whether the computed altitude is smaller or greater than the observed altitude. Through the point terminating the intercept and at right angles to it is drawn a small arc, representing only a tiny segment of the circle of equal altitude. For practical purposes this arc may be represented by a straight line. This line, known as the astronomical position line, indicates a series of possible positions of the ship. As in piloting, two or more intersecting lines of position are required to fix the position of a ship. The navigator would, of necessity, go through processes similar to those described above for two or more celestial bodies before deriving the desired celestial fix.

Electronic Navigation. This method of navigation is based on the use of equipment and systems in which radio waves and electronic techniques are utilized to chart the position and the route of a craft; see ELECTRONICS; RADAR; RADIO. Electronic and precision aids in most cases have increased the safety of navigation by supplying important information rapidly during periods of poor visibility, particularly in dangerous and congested waters. The modern navigator today makes wide use of these devices, both in pilotage waters and in the open sea. Radio provides the navigator with auxiliary information, including radio time signals, regular weather reports, storm warnings, and general navigational warnings concerning such hazards as derelict ships, extinguished navigational lights, and buoys adrift.

Radio as an aid to navigation was first used in the early 1900's, and aircraft in the 1930's, were fitted with communications equipment to enable them to receive navigational direction from the ground and with direction-finding loops to take bearings on ground transmitters. The basis for modern navigational aids is radio-direction finding used in one of two ways: an aircraft or ship takes bearings on fixed transmitters on the ground and fixes its position relative to two or more transmitters; or bearings taken by ground stations on a transmission from an aircraft or a ship are correlated at a center and a position is passed on to the craft. The principal electronic devices and systems are described below.

DIRECTION FINDER (D/F). The radio direction

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finder was the first navigational aid to come into general use. If the bearings of two transmitters with known locations can be measured, the position of the receiver may be determined. In its simplest form, a modern D/F consists of a conventional radio receiver with an antenna in the form of a coil of wire called a loop; see ANTENNA. Such a loop antenna has strongly directional properties; if it is mounted so that the axis of the loop points directly to a radio station, it will receive no signal whatsoever from that station; if it is mounted so that the plane of the loop passes through the radio station, it receives a strong signal. At intermediate positions the signal is intermediate in strength. In practice, a known station is tuned in, and then the loop is rotated until no signal is heard; this position is called the "aural null". The axis of the loop must then point directly toward (and away from) the station; this direction is plotted by the navigator as a line of position. Because it can be more accurately determined, the aural null is used in radio direction finding rather than the position of maximum signal. With properly functioning equipment and a strong signal, the aural null can be determined to within 3° , whereas the exact position of the maximum signal would be uncertain within a much larger range.

An automatic direction finder (ADF) has a motor that rotates the loop antenna, keeping the loop always in the null position. The motor also actuates a needle, similar in appearance to a compass needle, which indicates the position of the loop. This so-called radio compass points not toward north, but toward whichever station is tuned in on the loop antenna. Such direction finders can operate on any radio station broadcasting a continuous carrier on a frequency that the radio set can receive. Virtually all aircraft and ships are equipped with D/F equipment. Ground D/F stations have also been installed to aid lost aircraft. Radio D/F equipment is also used in police work and counterespionage to locate hidden radio stations.

Radio Ranges. Radio ranges and D/F were the principal radio navigation aids in general use before World War II. They operate on low frequencies (in the range 200 to 415 kilohertz) and so are subject to bending, night effect, and other anomalies.

A radio range consists of two pairs of antennas, one broadcasting the letter A in Morse code (dot, dash) and the other broadcasting the letter N (dash, dot); see MORSE CODE. The timing of the two letters is such that the space between letters just equals the time of a dash, while the space between the two parts of a letter just

equals the time of a dot. The patterns thus interlock so that if both are heard at once, the sound is continuous. The transmission pattern from each pair of antennas is directional, and is projected into two opposite "quadrants", each covering about 90° . An aircraft in one of the quadrants will hear only a single letter, either A or N; however, if it is on the borderline between the two quadrants, the navigator will hear the continuous tone which is called the "on-course signal". This borderline is called the beam, and is generally about 3° wide. Each radio range produces four beams, which are often at right angles to one another, but which may be directed at other angles if it is convenient; acute or obtuse angles are necessary when such beams must pass along the airways, as is usually the case. Directly above the range is an area in which no signal is heard. This area is called the cone of silence, and is small at low altitudes, but increases in size at higher altitudes.

RADIO BEACONS. A beacon is a radio station which is equipped with a nondirectional antenna and is used principally for homing. Low-powered beacons are called locators and are used in conjunction with radio compasses.

MARKERS. A marker is essentially a vertical radio beam, operating usually on a frequency of 75 megahertz which informs a navigator when he is passing over a particular point. Some markers have conical beams; fan markers have fan-shaped beams, wide in one direction and narrow in the other.

VISUAL-AURAL RANGE (VAR). VAR is essentially an ordinary radio range with only two beams instead of four, but with the quadrants positively identified. The two sides of a VAR beam are identified as "yellow" and "blue", so that if a pilot finds himself in a blue N quadrant he knows exactly which quadrant it is. A carrier wave is modulated at different frequencies along the two sides of the beam (one at 90 Hz and the other at 150 Hz), and these different frequencies actuate a needle in the cockpit of a suitably equipped airplane, forcing it to the blue or yellow side of a dial. The pilot thus gets a visual indication from the dial and an aural indication from his earphones, and may fly the beam using either indication. The receiver for VAR is identical with part of the equipment for ILS (see *Instrument Landing System*, below) so that the aircraft need not carry special equipment.

OMNIRANGE OR OMNIDIRECTIONAL RANGE (MOR OR VOR). Omnirange is, in effect, a radio range with an infinite number of (or, in practice, 360) beams. Omnirange stations are operated on

both VHF (very high frequency) and LF (low frequency): VHF omnirange is called VOR; the designation of low-frequency omnirange, originally LOR, was changed to MOR to avoid confusion with loran. VOR is useful at ranges up to 100 mi.

The omnirange station has four antennas similar to the antennas of a range station, plus one central antenna. The central antenna broadcasts a continuous reference signal; the other antennas broadcast a variable signal that is rotated by a radiogoniometer at 1800 revolutions per min. At the instant when the rotating signal points toward due north, it is in phase with the reference signal; at all other times it is out of phase with the reference signal by an amount that depends on its direction. The receiver, by measuring this phase difference, can determine its bearing from the station. In practice the omnirange receiver has three dials, one of which can be set manually to any desired course, the second of which tells whether the plane is to the left or right of the course, and the third of which resolves 180° ambiguity by indicating either "from" or "to". Omnirange can be used for homing by selecting any desired course; it can be used for determining a line of position by turning the course selector until the second dial reads "on course", and then noting the bearing to the station.

RADIO ALTIMETER. Radio altimeters measure the actual height of the craft above the ground or buildings, whereas ordinary altimeters merely measure air pressure, which can be converted into altitude above ground only if the navigator knows the altitude above sea level of the nearest ground, and the barometric reading there at that instant.

Any airborne radar could be used as a radio altimeter, but its accuracy and the minimum height that it could measure would be unsatisfactory. Radar sets designed specifically for this purpose (operating with a peak power of about 10 watts, a pulse length of about $\frac{1}{4}$ microsecond, and a frequency of about 440 megahertz) can determine altitude with an accuracy of about 50 ft. to a minimum altitude of about 100 ft. The frequency-modulated radio altimeter can measure altitudes up to about 100 ft. with an accuracy of better than 10 ft., and at its maximum range of 4000 ft. it has an accuracy of 60 ft.

The frequency-modulated radio altimeter has a transmitting antenna and a receiving antenna. A frequency-modulated wave sent out by the former is received by the latter both directly and after reflection from the ground. During the time taken for the round trip of the reflected wave the frequency of the signal has changed,

so that the receiving antenna receives two waves of different frequencies, which results in the production of a beat frequency. The magnitude of the beat frequency is proportional to the distance from the ground, and a meter that measures the beat frequency can be calibrated directly in terms of altitude. A typical altimeter of this type operates at 440 megahertz and is modulated at a frequency of 120 Hz.

GEE. This radarlike apparatus is a pulsed, three-station, hyperbolic system operating in the 20 to 85 megahertz band and providing navigational fixes up to slightly beyond optical range. Designed originally in 1937, Gee was not developed until 1940, during World War II, when stations built in Great Britain provided reliable navigational aid to aircraft operating over western Europe. A Gee chain comprises a master transmitter and two slave transmitters, located at distances of 50 to 100 mi. from the master. Pulses radiated from the master transmitter trigger pulse responses from the slave transmitters at precisely determined recurrence rates. The times at which the three pulses originate bear a known relationship to one another and each master-slave time difference measured at the receiver by a cathode-ray tube (see CATHODE RAYS) determines a hyperbolic position line. Two position lines derived from the two master-slave combinations provide a fix.

DISTANCE-MEASURING EQUIPMENT (DME). DME is a secondary radar system in which an airborne interrogator sends out a pulse that triggers a responding pulse from ground equipment, called a transponder. From the coded response the interrogator obtains the distance from the identification of the ground station.

LONG RANGE NAVIGATION OR LORAN. This is the pulsed hyperbolic system developed by the United States during World War II to provide long-range navigation over sea for ships and aircraft. The radio frequency used in loran is approximately 2 megahertz, which permits long-distance reception over oceans but is not effective at long distances over land except at night. Its method of operation is similar to that of Gee, and a single airborne system, utilizing both Gee and loran, was evolved in a cooperative effort between the U.S. and Great Britain. See LORAN. **REBECCA-EUREKA.** This is probably the best-known responder system combination. Rebecca is the airborne interrogator, and Eureka the responder. The system is based on conventional secondary-radar techniques. The interrogating pulses are radiated from a central aerial near the nose of the aircraft, and the replying pulses from the responder are received by two aerials on either

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side of the nose. The pickup is indicated on a cathode-ray tube showing a vertical linear base. The responder pulses show as a horizontal "blip" across the line base; the range is indicated by the position of the blip in the vertical lines.

CONSOLAN. This system provides coded signals from which the direction of a station can be determined. This information ensures accurate bearings that are independent of all navigation equipment aboard. Consolan signals are usable up to 800 mi. or more. Three stations of this system are in operation in the U.S., one on Nantucket Island, near Cape Cod, Mass., another at San Francisco, Calif., and a third near Miami, Fla.

NAVY-NAVIGATION SATELLITE SYSTEM. Of recent origin, this system provides worldwide coverage with a high degree of accuracy, using four orbiting satellites and a ground-station complex. The service, however, is very expensive and has only a few users, such as the British transatlantic ocean liner *Queen Elizabeth II*. See SATELLITE, ARTIFICIAL.

OMEGA. This is a long-range, hyperbolic, very-low-frequency (V.L.F.) system, based on continuous wave-phase comparison. Four stations are providing wide coverage over the North Atlantic and North America and four additional stations, to be operative in the early 1970's, are expected to provide global coverage for this system. The Omega equipment will then be used on a world scale to guide military and civilian ships and aircraft.

COURSE-LINE COMPUTER. A navigator attempting to fly a course which passes near, but not over, a station with VOR or DME has difficulty in determining whether or not he is on course; the direction and distance to the station vary in a complex manner as the aircraft proceeds in a straight line at constant speed. The course-line computer is a device that solves this navigational problem, and permits the navigator to follow such a course merely by watching an instrument.

GROUND-CONTROLLED APPROACH (GCA). This is an instrument-approach system consisting of extremely high precision microwave radar equipment that gives the position of an aircraft in range, azimuth, and elevation. It is primarily designed to bring the pilot through low overcast or low horizontal visibility so that he can make a normal landing by visual contact. Skilled operation of this system in the aircraft and on the ground permits emergency landing under conditions of nearly zero visibility. GCA uses two sets of radar scopes. One locates planes at a considerable distance, such as 10 to 15 mi. The

controller using this set of scopes maintains communications with planes waiting to land, "stacks" them (that is, assigns each one to a separate altitude at which it can circle without danger of collision), and brings them in one at a time along a standard approach pattern until they are on the final leg of the approach. On the final approach leg the final-approach controller, using precision scopes, takes control. He also broadcasts verbal instructions, principally concerning altitude and lateral deviation from the desired glide path, and guides the pilot virtually to the end of the runway.

INSTRUMENT LANDING SYSTEM (ILS). This system is primarily designed for instrument approach, but in emergency can be used for landing. It consists essentially of two beams, similar to radio range beams, one horizontal and the other vertical. The horizontal beam (called the "localizer") is identical with the VAR beam described above, and uses the same equipment. The vertical beam (called the "glide-path") is extremely narrow, and is inclined to the ground at an angle of $2\frac{1}{2}^\circ$. The pilot follows the two beams by means of two pointers, one horizontal and one vertical, on a single dial.

Both ILS and GCA have valuable supplementary aid from a standardized high-intensity lighting system along the runway and approach so that the pilot can make visual contact with the ground even in extremely bad weather and identify his position in relation to the runway. **AUTOMATIC CARRIER-LANDING SYSTEM (ACLS).** This is a completely automatic system designed to land an aircraft without pilot control. The apparatus correlates, by means of an electronic computer aboard the carrier, data obtained by radar and directs automatically the flight pattern of the plane, bringing it in for a safe landing.

Most radio navigational systems now in use are operated in conjunction with high-speed computers; see COMPUTER.

Navigation and Meteorology. The ease with which a voyage is accomplished depends to a great extent upon the weather conditions encountered. The navigator may be confronted with heavy seas, high winds, and periods of heavy precipitation and poor visibility which could retard his ship and at times endanger its safety. The attempts to foresee the weather conditions which may be encountered and how these might be used to the advantage of the craft. In addition to his own knowledge of meteorology (q.v.), the navigator relies on national and international meteorological services, which constantly collect, evaluate, and disseminate weather information on a global basis.

Frequent and diversified weather radio broadcasts are made to aid the navigator, and he uses the information to prepare weather maps. An electronic device known as the radio weather facsimile makes possible the reception by ships, far out at sea, of weather maps and sea-condition charts prepared by experts in central weather stations; see FACSIMILE.

Radio has also decreased to a great extent the potential danger to navigation of storms, hurricanes, and typhoons by providing timely warnings and fairly accurate predictions of storm paths. Artificial weather satellites orbiting the earth have proved to be of vital importance in supplying information about impending storm-weather conditions far ahead of time. This information is broadcast to all shipping in the area where the weather is deteriorating. Some ships

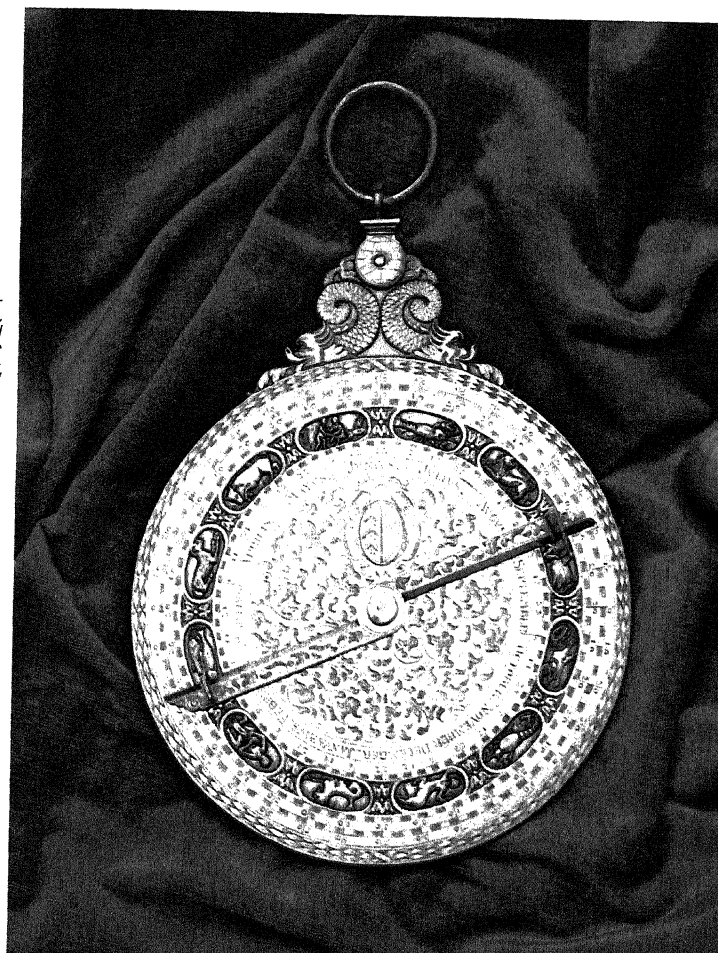
are at present being navigated by the so-called least-time track method, which is based upon a five-day forecast of the ocean area involved and permits planning a course along which pressure systems, wind directions, and accompanying seas may be used to the greatest advantage.

Finally, the navigator uses his own weather instruments and visual observations of the weather to help him in the navigation processes. Radar weather echoes are used increasingly to assist the navigator in this respect.

Navigation in High Latitudes and in Ice. With the growing interest in regions of high latitude, an increasing number of navigators are encountering the peculiarities of polar and ice navigation. These navigators may encounter special problems, including the loss of horizontal directive force of the magnetic compass when ap-

A 16th-century astrolabe, made of iron, about one-third actual size. Invented by the ancient Greeks, the astrolabe was employed by mariners until the 18th century, when it was replaced by the sextant. In the hands of a skillful navigator, the instrument could be used to establish time of day, latitude, and longitude.

Mark Sexton—
Peabody Museum



NAVIGATION

proaching the magnetic poles; the lack of incompleteness of hydrographic surveys and the consequent unreliability of the charts of the area; the increased incidence of atmospheric refraction (q.v.), causing large errors in celestial observations (see *OPTICS: Refraction of Light*); the frequent loss of a well-defined horizon due to ice or haze; the seasonal absence of day or night; the lack of coverage by electronic navigational systems; and the presence of ice fields and icebergs.

In these poorly charted areas, frequently, the primary problem for the navigator is not the determination of the exact latitude and longitude, for these are meaningless if the charts are inaccurate. It is, however, necessary to know how far he is from the nearest point of land or danger, and how much water is under the keel of his ship. For this reason most high-latitude navigators find the radar and the echo sounder to be their most important instruments.

The greatest danger to navigation in the polar regions is the possibility of encountering pack ice or icebergs. A ship caught in an ice field may be locked in for protracted periods of time and may risk hull damage, and collision with an iceberg may be disastrous. To assist navigation in these waters, the United States Coast Guard operates the International Ice Patrol, which is financed by fourteen countries in proportion to the strength of their merchant fleets on the North Atlantic routes. The primary objectives of the service are to patrol the areas where ice is a menace to shipping, to keep track of ice and icebergs, and to warn shipping accordingly.

Missile Navigation Systems. The development of rockets and guided missiles has accelerated the introduction of new and sophisticated electromechanical systems of navigation, including automatic celestial systems, Doppler navigation, and inertial navigation.

The automatic celestial system, known also as the star-tracking system, consists of an electronic device capable of computing a celestial solution and feeding it to a unit designed to track automatically a celestial body or bodies. The tracking unit feeds back the information to computers which then record the actual position of the vehicle.

Doppler navigation, named after the Austrian mathematician and physicist Christian Johann Doppler (q.v.), is concerned primarily with air navigation and involves the analysis of the shift in radio frequency resulting from reflection of radar waves by an approaching or receding surface; see *DOPPLER'S PRINCIPLE*.

Inertial navigation, which is based on inertial

guidance, is a self-contained system, wholly independent of either visual or electronic information from outside of the craft in which it is operating. This system consists of a certain type of accelerometer, stabilized by gyroscopes which register the magnitude of the acceleration of a craft in both a north-south and an east-west direction from a known starting point; the accelerations are converted by electronic computers into a precise position of the craft.

These innovations, however, are currently used only in military projects and may eventually be adapted for general navigation use.

A.E.F.
NAVIGATION ACTS, sometimes grouped as **ACTS OF TRADE AND NAVIGATION**, legislation passed by Great Britain in the 17th and 18th centuries to promote and protect British industry and commerce against foreign competition. The navigation acts stipulated that goods imported or exported by British colonies in Africa, Asia, or America be shipped on vessels constructed by English shipbuilders and sailed by crews that were three-fourths comprised of Englishmen. Goods imported from the colonies into England also had to arrive on English vessels. Goods from foreign countries were restricted to vessels from the exporting nation or to English ships. The term "English" referred to individual nationality, not to place of residence, and the colonists and colonial shipping were considered "English". The trade acts named certain articles, principally tobacco, rice, and indigo, that the colonists could export only to another British colony or to England. Later statutes such as the Woolens Act of 1699, the Hat Act of 1732, and the Iron Act of 1750 were attempts to prevent colonial manufacturing that might threaten the industrial economy of England.

The trade and navigation acts were a development of the mercantile system (q.v.), an economic policy prevailing in Europe through the 16th, 17th, and 18th centuries. The regulations had clear advantages for British subjects in the New World. American shipbuilding prospered because of the requirement that all vessels be English-made. Producers of most of the named articles found a stable, protected market in England and in their sister colonies. A system of export bounties and rebates was set up and actually kept prices of English goods lower than those that would have prevailed under a system of open competition.

During the period of the French and Indian War, however, when Parliament was forced to seek increased revenues to pay the costs of defending the New World colonies, British offi-



An Attic vase depicting a Greek warship. Such ships were employed more as transport than as combat vessels.

Scala-New York/Florence

cials determined to levy heavier duties under the provisions of the acts of trade and navigation. American colonists found these duties overly harsh and protested them as taxation without representation. The trade and navigation acts are considered among the indirect causes of the American Revolution (q.v.).

NAVIGATION, AIR. See **NAVIGATION: Electronic Navigation.**

NAVIGATORS ISLANDS. See **SAMOA.**

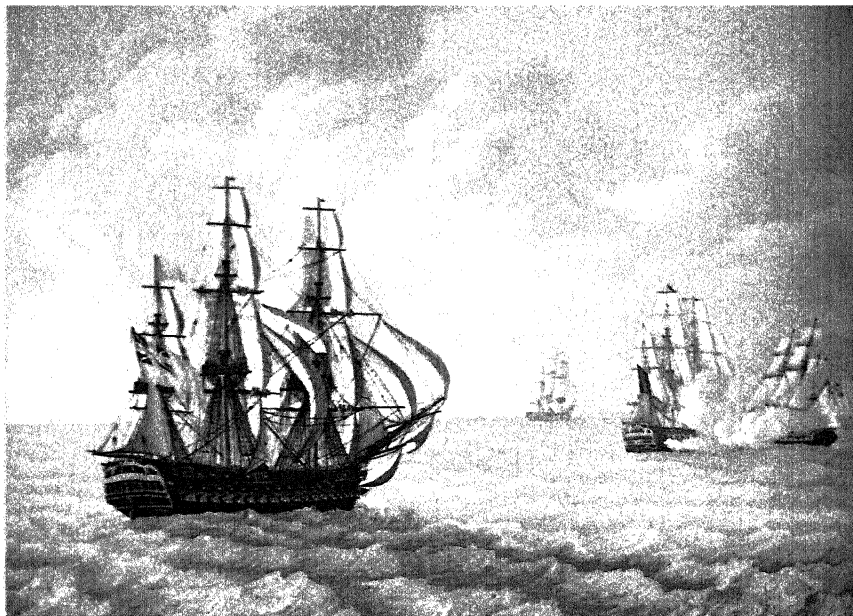
NAVY, marine military force of a country, including men, vessels, weapons, shipyards, and other shore-based installations. Naval functions, which are both strategic and tactical, include the protection of shipping, the transportation of invasion forces and defense against enemy invasion by sea, the enhancement of national power by the display of the flag in foreign ports, and, in recent times, combined operation with land and air forces for a coordinated war effort. A navy usually operates its vessels in fleets, with a variety of specialized ships and boats giving flexibility and self-sufficiency. Occasionally vessels operate singly or in small packs to harass and destroy shipping.

The powerful peoples in antiquity, the Carthaginians, Phoenicians, Persians, and Greeks, had efficient fleets, and Rome, although essentially a land power, developed a navy that helped defeat Carthage in the Punic Wars (q.v.). The earliest ships were propelled by oar supple-

mented by sail. They operated close to shore, carried infantrymen (later called marines to differentiate them from standard land fighters), and engaged in ramming and boarding tactics. The introduction of catapults to throw missiles led to longer-range combat. The galleys of Venice and Genoa operated in this fashion, but the Norsemen (q.v.) or Vikings and Normans used their vessels merely to transport land fighters. The Byzantines introduced "Greek fire", a burning agent developed for use against enemy fleets.

The age of exploration and nationalism coincided with the development of sail and gunpowder. No longer confined to offshore action, navies traveled long distances and fired cannon at ranges of several hundred yards. The countries of western Europe, notably France, Great Britain, Portugal, the Netherlands, and Spain, developed large and complex navies and vied for supremacy on the seas. By the early 19th century, Great Britain had become the master. Her vessels, seamanship, and shipyards were the envy of the world; her navy had helped her acquire and protect an empire and guarded its ocean trade.

In the 19th century, steam propulsion and steel construction replaced sail and wood.



Mark Sexton-Peabody Museum

Navy. Plate 1. Above: "Naval Engagement Battle Between the French and English Vessels" (1812), an oil painting attributed to George Ropes. The scene, possibly an incident in the Napoleonic Wars, portrays in the foreground one of the big English men-of-war of the period, with three gun decks. Below: A chief radarman stands watch aboard a Navy escort vessel. Special occupational groups (ratings) on Navy ships range from nuclear technicians and missile technicians to cooks and hospital corpsmen.

LCDR George Hubbard—U.S. Naval Photographic Center





The U.S.S. Kitty Hawk is shown here under way. The second ship to bear that name, the Kitty Hawk is more than 1000 ft. long and 63 ft. wide and is notable for carrying in excess of 100 jet and conventional aircraft.

U.S. Navy

Overseas possessions were needed for coaling stations so that naval fleets could operate far from home waters. At the same time, improvements in ordnance (rifled cannon, with greater accuracy and range and better shells and charges) were making timbered ships obsolete. In the Crimean War and the American Civil War, ironclads proved practical. "Compound armor" and steel later permitted a reduction in the thickness of armor, and the invention of screw propellers offered speed and maneuverability. At the same time, naval rams were used extensively for coastal defense.

Technological advances in the 20th century affected shipbuilding, propulsion, weapons, and operation. New and specialized functions brought about new designs, from the superdreadnought to the tender and tug, from landing ships to PT boats. Submarines were used extensively in World Wars I and II. Coal gave way to fuel oil, in its turn being replaced by nuclear power, which permits extended voyages. Torpedoes, shaped charges, mines, heavy-caliber guns, rockets, and nuclear ballistic missiles have become standard weapons. The development of radar, electronic communications, detection devices, and navigational aids has transformed battles so that opposing fleets are now far from each other. The adaptation of aircraft to naval use and the introduction of aircraft carriers have modified operations, communications, and transport.

A modern navy has a wide range of instruments to perform its functions, which remain much the same as always. Basically, a navy seeks seapower, control of the bodies of water on the earth. It has at its command underwater, surface, and aircraft that give it striking power and a complex shore establishment that gives it support.

See also SHIPS AND SHIPBUILDING; SHIPS, NAVAL; UNITED STATES NAVY.

M.B.

NAVY, DEPARTMENT OF THE, one of the three major components of the United States Department of Defense; see DEFENSE, DEPARTMENT OF. Created as a separate executive department of the Federal government by Congressional enactment in 1798, the department was incorporated into the National Military Establishment by the National Security Act of 1947. It is administered by the secretary of the Navy, who is appointed by the President with the consent of the Senate and functions under the direction of the secretary of defense. The fundamental aim of the department is to maintain the United States Navy (q.v.) as a thoroughly integrated entity in sufficient strength on the sea and in the air to uphold, in conjunction with the other armed forces, the national and international policies and interests of the United States, to

NAVY, UNITED STATES

support its commerce, and to guard the nation and its overseas possessions and dependencies.

The administrative functions of the department are performed by a group of agencies operating within the executive office of the secretary. The chief of naval operations is the principal naval adviser to the President, to the secretary of defense, and to the secretary of the Navy in matters relating to the conduct of warfare, and the principal naval adviser and naval executive to the secretary of the Navy on the activities of the Navy. He is also the Navy member of the Joint Chiefs of Staff. Six deputy chiefs of naval operations handle matters relating to manpower and naval reserve, fleet operations and readiness, logistics, air, plans and policy, and development. Under a major reorganization within the department in 1965, the Naval Material Command was established. Reporting to this command are the Naval Air Systems Command, Naval Electronics Systems Command, Naval Facilities Engineering Command, Naval Ordnance Systems Command, Naval Ship Systems Command, the Naval Supply Systems Command. Other specialized functions of the department are handled by the Bureau of Medicine and Surgery and the Bureau of Naval Personnel. The system of military law within the Navy is administered by the Office of the Judge Advocate General. Also serving under the secretary of the Navy is the commandant of the Marine Corps; see MARINE CORPS.

A number of agencies operating within the department are responsible for the performance of various specialized and technical functions. The United States Naval Oceanographic Office is charged with making hydrographic and oceanographic surveys in foreign waters and on the high seas and with collecting and disseminating hydrographic and oceanographic information and data. The Naval Observatory (q.v.) performs astronomical observations and is responsible for the publication of such data as will afford means of safe navigation to U.S. and other naval vessels and aircraft.

NAVY, UNITED STATES. See UNITED STATES NAVY.

NÁXOS, Greek island in the Aegean Sea, largest of the Cyclades group, midway between the coasts of Greece and Turkey. Náxos is extremely fertile; almonds, figs, citrus fruit, wine grapes, and olives are grown, and goats and sheep are raised. The island also has emery, granite, and marble quarries. The chief town is Náxos (pop., 1963 est., 5000), on the n.w. shore.

NAZARENES, in the New Testament, followers of Jesus Christ (Acts 24:5). In later Church his-

tory, the term was applied to a sect of Jewish Christians of the 4th century who observed Jewish ritual, including circumcision, the Sabbath (q.v.), and the dietary laws; see KOSHER. They also believed in the divinity of Christ (see CHRISTOLOGY) and the apostleship (see APOSTLE) of Saint Paul (q.v.). The Nazarenes differed from another group of Jewish Christians, the Ebionites (q.v.), in both their beliefs and in their refusal to require that Gentile Christians observe the Jewish ritual.

The term "Nazarenes" is also used to designate a school of early 19th-century German painters; see PRE-RAPHAELITES.

NAZARETH, village of Israel, in lower Galilee, the Biblical name for northern Palestine. It is on a hill overlooking the Plain of Jezreel (q.v.), about 21 miles s.e. of the modern Israeli city of Haifa. According to the New Testament, Nazareth was the home of Mary and her husband, Joseph (q.v.; Luke 1:26-27), and the childhood home of Jesus (see JESUS CHRIST; Luke 2:51 and elsewhere). Jesus was later rejected by its inhabitants and made Capernaum (q.v.) His headquarters (Luke 4:14-31). Contemporary Nazareth, a place of pilgrimage, contains many shrines commemorating its Biblical associations, some of them having been rebuilt after destruction by the Muslims during the Middle Ages. Prominent among them are the Church of the Annunciation, the Church of Saint Joseph, and Saint Mary's Well. Pop. (1968) 30,900.

NAZARITES, in the Old Testament, Israelites who were especially dedicated to the service of Jehovah (q.v.). The vow they took was pre-Mosaic (see MOSES) in origin, but its stipulations are found in Numbers 6:1-21. The principal obligations were abstinence from intoxicants, from cutting of the hair or shaving, and from approaching or touching a dead body. Originally binding for life, as in the case of the early Hebrew hero Samson (q.v.), the vow later was limited to a definite period. Saint Paul (q.v.), the Apostle demonstrated his loyalty to the Jewish Law after his conversion to Christianity by accompanying four other Jewish Christians in Jerusalem who were fulfilling the Nazarite vow (Acts 21:23-26).

NAZI PARTY. See NATIONAL SOCIALISM.

NDOLA, city in Zambia, capital of Western Province, near the border of the Republic of Zaire, about 170 miles n. of Lusaka. Second-largest city in the country, it is a major industrial center of the copper belt and has long been an African crossroads. Rail spurs radiate to surrounding mines. The city produces chemicals, brick and tile, wood products, pipes, tires, soap,

sugar, and mineral water and is a leading center of copper and cobalt processing. Known as a slave-trading town until the end of the 19th century, Ndola became an administrative center in 1904. The township was established in 1924 and the city in 1932. Pop. (greater city; 1972 est.) 201,300.

NEAGH, LOUGH, largest lake of the British Isles, bordering Londonderry, Antrim, Armagh, and Tyrone counties, Northern Ireland. It is 18 mi. long and 11 mi. wide, and has an area of 153 sq.mi. Streams flowing into the lake include the Blackwater, Main, and Lagan. Lough Neagh is drained by the Bann R., which flows northward to the North Channel.

NEANDERTHAL MAN. See MAN, ANCIENT: *Neanderthals*.

NEARSIGHTEDNESS. See EYEGLASSES; VISION: *Sight Defects*.

NEBO. 1. In the Bible, a mountain in Moab where the Hebrew prophet Moses (qq.v.) saw the Promised Land. 2. In ancient religion, the name of the patron deity of the city Borsippa, in Babylon. He was the god of wisdom and the planet Mercury was sacred to him.

NEBRASKA, one of the West North Central States of the United States, bounded on the N. by South Dakota, on the N.E. and E. by the Missouri R., on the S. by Kansas and Colorado, and on the W. by Colorado and Wyoming. Nebraska is roughly rectangular, measuring about 420 mi. from E. to W. and about 210 mi. from N. to S.

Area (15th State in rank)	77,227 sq. mi.
Land	76,483 sq. mi.
Inland water	744 sq. mi.
Population	(1970, 35th in rank) 1,483,791
	(1960, 34th in rank) 1,411,330
	(1950) 1,325,510
Altitude	840 ft. to 5426 ft.
Capital	Lincoln (1970) 149,518
Largest city	Omaha (1970) 346,999
Entered Union (37th State)	March 1, 1867
Nickname	The Cornhusker State
Motto	Equality Before the Law
Flower	goldenrod
Bird	western meadowlark

THE LAND

Nebraska lies within the Great Plains region. Its surface slopes gradually from an altitude of 5426 ft. above sea level in the W. (the highest point in the State) to 840 ft. in the S.E. (lowest point). The average elevation of Nebraska is 2600 ft. The area is a vast undulating prairie. A line drawn from the S.W. corner to the N.E. corner divides Nebraska into its two main physiographic regions, the agricultural loess plain in the S.E. and the sand-hill region in the N.W. Two minor physiographic areas, the high plains and the Pierre Shale Hills, occupy the N.W. corner.

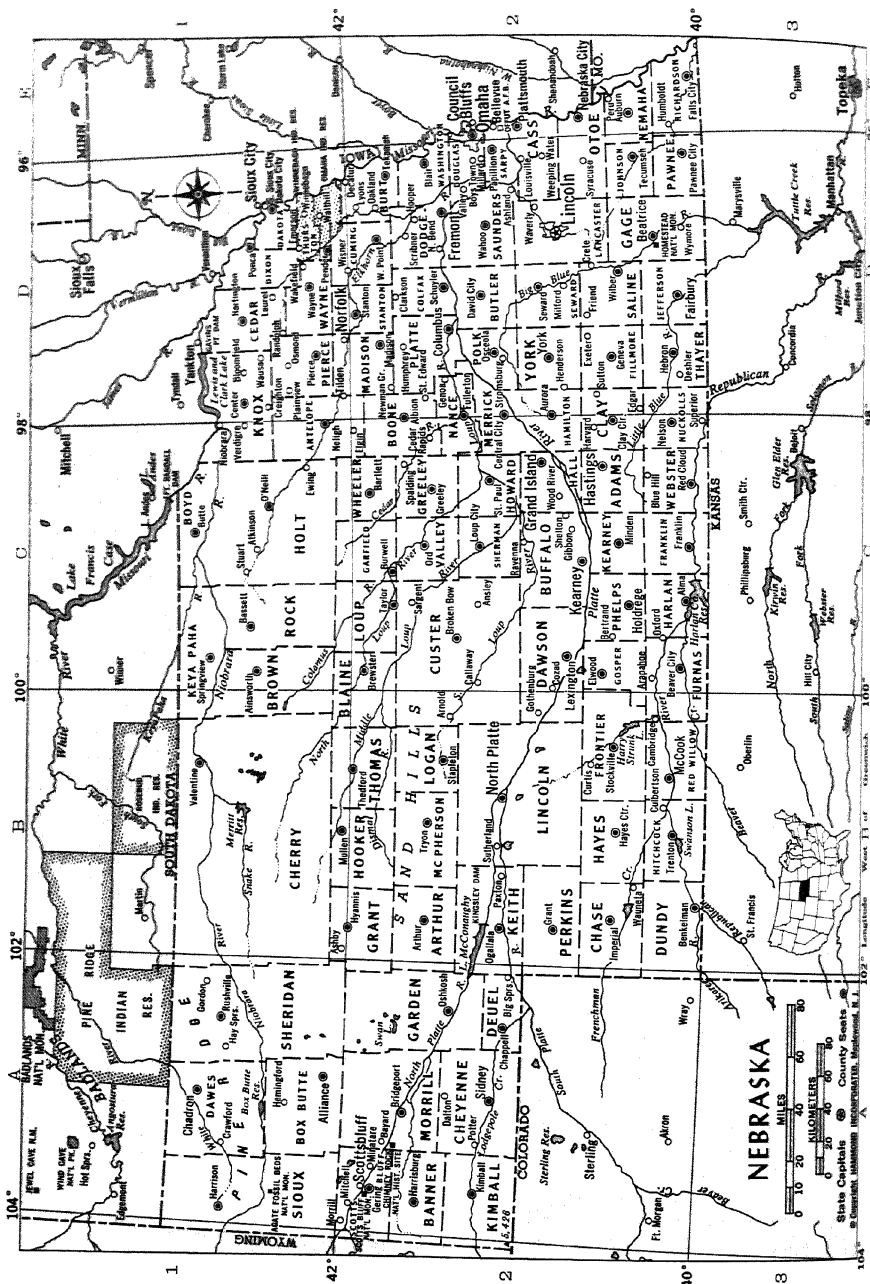
The loess plain is dissected by many river valleys. The sand-hill region consists of small hills

raised by the action of winds; this area also contains valleys, tablelands, and hundreds of small lakes. The high plains consist of canyon-broken tableland and isolated buttes that rise hundreds of feet above the surrounding plains. The Pierre Shale Hills, often called the Badlands, consist of hills and terraces of varicolored rocks and soils that are almost denuded of vegetation.

Rivers and Lakes. The State is drained entirely by the Missouri R. and its tributaries. Because of the gentle and regular slope of the land, most of these rivers flow in nearly straight and parallel lines E. and S.E., and they are, for the most part, wide and shallow. The four principal rivers are the Missouri, which forms a portion of the boundary with South Dakota and all of the boundary with Iowa and Missouri; the Platte, which flows from W. to E. through the center of the State to join the Missouri; the Niobrara, which also flows from W. to E. through the entire State in the N.; and the Republican, which flows W. to E. in the S. part of Nebraska. Among reservoirs created by water-development projects are Lake McConaughy, formed by Kingsley Dam on the North Platte R., Box Butte Reservoir on the Niobrara R., Enders Reservoir on Frenchman Creek, Harlan County Reservoir on the Republican R., and Harry Strunk Lake on Medicine Creek.

Climate. Nebraska has a continental climate, with hot summers, cold winters, low humidity, great variations in temperature and rainfall from year to year, and frequent changes in weather from day to day. Although hot summer nights occur rather frequently in the E. part of the State, they are very rare in the higher elevations of the W., where rapid cooling usually occurs after sunset. The highest temperature recorded in the State was 118° F. (at Geneva, Hartington, and Minden); the lowest, -47° F. (at Camp Clarke). The average annual precipitation is 27 in. in the E., 22 in. in the central part, and 18 in. in the W. Average seasonal snowfall is about 29 in. The average annual number of days with measurable

Climate	Lincoln	North Platte	Scottsbluff
Normal temperatures (in °F.)			
January maximum	32.8	36.6	38.5
January minimum	11.7	10.1	11.3
July maximum	88.9	87.6	88.8
July minimum	65.7	61.0	58.6
Annual	51.0	48.6	48.2
Normal precipitation (in inches)			
Wettest month	4.99	3.77	3.36
Driest month	.69	.41	.39
Annual	26.66	19.90	14.57
Latest frost	April 20	April 30	May 14
Earliest frost	Oct. 17	Oct. 7	Sept. 26
Mean number of days between latest and earliest frosts	180	160	135



INDEX TO MAP OF NEBRASKA

Cities and Towns					
Ainsworth	⊙	C1	Emerson	.....	D1
Albion	⊙	D2	Ewing	.....	C1
Allamore	⊙	A1	Exeter	.....	D2
Alma	⊙	C2	Fairbury	.....	E2
Amelia	⊙	C2	Falls City	.....	E2
Amherst	⊙	C2	Franklin	.....	C2
Arapahoe	⊙	C2	Frederick	.....	D2
Arnold	⊙	B2	Friend	.....	D2
Arthur	⊙	B2	Fullerton	.....	D2
Ashby	⊙	B1	Geneva	.....	D2
Ashland	⊙	D2	Genoa	.....	D2
Ashmore	⊙	C1	Gerding	.....	A2
Auburn	⊙	F2	Gibson	.....	C2
Aurora	⊙	D2	Gordon	.....	A1
Avon	⊙	C2	Gothenburg	.....	B2
Baker	⊙	C1	Grand Island	.....	C2
Baldwin	⊙	A2	Grant	.....	B2
Beatrice	⊙	D2	Greeley	.....	C2
Beaver City	⊙	C2	Harrisburg	.....	A2
Bellevue	⊙	B2	Harrison	.....	A1
Benkelman	⊙	C2	Hartington	.....	D2
Bertrand	⊙	A2	Harvard	.....	C2
Bia Springs	⊙	A2	Hastings	.....	C2
Blair	⊙	D2	Hay Springs	.....	A1
Bloomfield	⊙	D1	Hayes Center	.....	B2
Blue Hill	⊙	C2	Hebron	.....	D2
Boys Town	⊙	D2	Hemphill	.....	A1
Brewster	⊙	D2	Henderson	.....	D2
Bridgeport	⊙	A2	Holdrege	.....	C2
Broken Bow	⊙	C2	Hooper	.....	D2
Burlington	⊙	C2	Humboldt	.....	E2
Butte	⊙	C1	Humphrey	.....	D2
Callaway	⊙	C2	Hysmin	.....	B2
Cambridge	⊙	B2	Imperial	.....	B2
Cedar Rapids	⊙	D2	Kearney	.....	C2
Center	⊙	D1	Kimball	.....	D2
Central City	⊙	C2	Laurel	.....	D1
Chadron	⊙	A1	Lexington	.....	B2
Chappell	⊙	A2	Lincoln (cap.)	.....	D2
Clarkson	⊙	D2	Louisville	.....	D2
Clay Center	⊙	C2	Loup City	.....	C2
Columbus	⊙	D2	Lyons	.....	D2
Cosmo	⊙	C2	Madison	.....	D2
Crawford	⊙	A1	McCook	.....	B2
Craigton	⊙	D2	Millard	.....	D2
Crest	⊙	D2	Millard	.....	D2
Culbertson	⊙	B2	Minatare	.....	A2
Curtis	⊙	B2	Minnehad	.....	A2
Dakota City	⊙	D1	Mitchell	.....	A2
Dallas	⊙	A2	Morrill	.....	A1
David City	⊙	D2	Mullen	.....	B1
Decatur	⊙	D2	Nebraska City	.....	E2
Deshler	⊙	D2	Neligh	.....	C1
Edgar	⊙	C2	Nelson	.....	C2
Edna	⊙	C2	Newman Grove	.....	D2
Elwood	⊙	C2	Niobrara	.....	C1
			Norfolk	.....	D1
			North Bend	.....	D2
			North Platte	.....	B2
			Oakland	.....	D2
			Ogallala	.....	D2
			Omaha	.....	D2
			Omaha	.....	D2
			Ord	.....	C1
			Oscoda	.....	D2
			Oshkosh	.....	A2
			Osmond	.....	D1
			Oxford	.....	C2
			Papillion	.....	D2
			Pawnee City	.....	D2
			Paxton	.....	D2
			Pender	.....	D2
			Peru	.....	D2
			Pierce	.....	D2
			Plainview	.....	D2
			Plattsmouth	.....	D2
			Ponca	.....	D1
			Potter	.....	A2
			Randolph	.....	D1
			Ravenna	.....	D2
			Red Cloud	.....	C2
			Rushville	.....	A1
			Saint Edward	.....	D2
			Saint Paul	.....	D2
			Sargent	.....	D2
			Schuyler	.....	D2
			Scottsbluff	.....	A2
			Scottdale	.....	D2
			Seward	.....	D2
			Shelton	.....	D2
			Sidney	.....	A2
			South Sioux City	.....	D1
			Spalding	.....	C2
			Springview	.....	C1
			Stanton	.....	D2
			Stapleton	.....	B2
			Stockville	.....	D2
			Stromsburg	.....	D2
			Stuart	.....	C1
			Superior	.....	C2
			Sutherland	.....	D2
			Sutton	.....	D2
			Syracuse	.....	D2
			Taylor	.....	C2
			Tecumseh	.....	D2
			Tekamah	.....	D2
			Theftord	.....	D2
			Tilden	.....	D1
			Trenton	.....	B2
			Tryon	.....	B2
			Valentine	.....	B1
			Valley	.....	D2
			Vendig	.....	C1
			Waco	.....	D2
			Wadsworth	.....	D2
			Walbridge	.....	D1
			Waltham	.....	D1
			Waverly	.....	B2
			Wayne	.....	D1
			Weeping Water	.....	D2
			West Point	.....	D2
			Wilber	.....	D2
			Winnebago	.....	D1
			Winnebago	.....	D1
			Wood River	.....	C2
			Wymore	.....	D2
			York	.....	D2

⊙ County seat

Physical Features

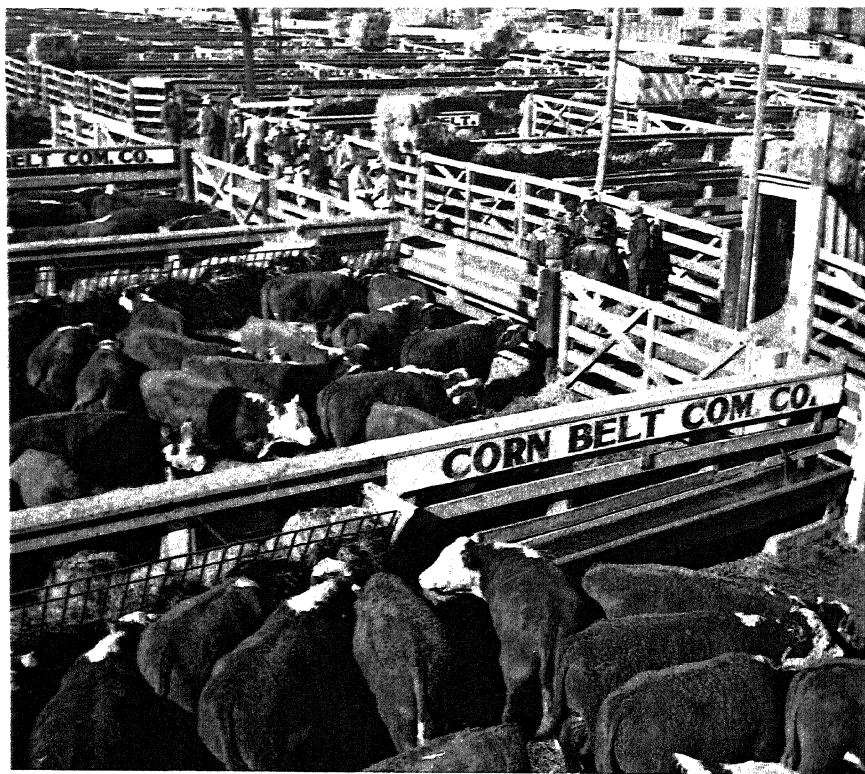
Agate Fossil Beds Nat'l Mon.	.....	A1
Arkansas (river)	.....	A3
Beaver (creek)	.....	B3
Big Blue (river)	.....	D2
Box Butte (res.)	.....	A1
Cedar (river)	.....	C2
Chimney Rock Nat'l Hist. Site	.....	A2
Columbia (river)	.....	C1
Dismal (river)	.....	B2
Elkhorn (river)	.....	D2
Frenchman (creek)	.....	A2
Gavins Point (dam)	.....	D1
Harlan County (res.)	.....	C2
Harry Strunk (lake)	.....	B2
Homestead Nat'l Mon.	.....	D2
Keys Pkgs (river)	.....	B1
Kinsley (dam)	.....	B2
Lewis and Clark (lake)	.....	D1
Little Blue (river)	.....	C2
Lodgepole (creek)	.....	A2
Loup (river)	.....	C2
McConaughy (lake)	.....	B2
Meritt (res.)	.....	A1
Middle Loup (river)	.....	B2
Missouri (river)	.....	B2
Niobrara (river)	.....	C1
North Loup (river)	.....	B1
North Platte (river)	.....	A2
Offutt A.F.B.	.....	B2
Omaha Ind. Res.	.....	A2
Pine Ridge (hills)	.....	A1
Platte (river)	.....	C2
Republican (river)	.....	B3
Sand Hills	.....	B2
Scotts Bluff Nat'l Mon.	.....	A2
Snake (river)	.....	B1
South Loup (river)	.....	C2
South Platte (river)	.....	A2
Swan (lake)	.....	A2
Swanson (lake)	.....	B2
White (river)	.....	A1
Winnebago Ind. Res.	.....	D1

precipitation ranges from 77 at Valentine, 81 at North Platte, and 84 at Scottsbluff, to 98 at Lincoln. Tornadoes average ten per year, and hailstorms twenty to twenty-five per year.

Plants and Animals. The principal native plant life of Nebraska consists of 200 species of grasses. Short perennial grasses predominate in the w. part of the State, and tall prairie grasses in the e. part. Among three species are cottonwood, peachleaf willow, American elm, green ash, ponderosa pine, cedar, and maple. Wild flowers grow in profusion in the sand-hill region. The most common medium-sized mammals are coyote, fox, jackrabbit, badger, prairie dog, striped ground squirrel, and deer. The bison, which formerly abounded in the State, no longer roams the open range, but a few are in small captive herds.

Parks, Forests, and Other Places of Interest.

The national historic sites of Nebraska commemorate the opening of the West. The Homestead National Monument of America, near Beatrice, is the site of what is reputed to be the first claim under the Homestead Act of 1862. Scotts Bluff National Monument (q.v.), in the w., was a landmark on the Oregon Trail. Chimney Rock National Historic Site, in the w., a 500-ft. erosion tower, was a landmark and camp site on the Oregon Trail. A quarry area containing well-preserved Miocene-era mammal fossils was authorized as Agate Fossil Beds National Monument (q.v.) in 1965. The Nebraska National Forest, comprising almost 340,000 acres, has three divisions: the Bessey Division near Halsey, the Niobrara Division near Nenzel, and the Pine Ridge Division near Chadron. Fort Niobrara Na-



A view of the stockyards in Omaha, Nebraska. The city is a major livestock and meat-packing market, and many packers have plants close to the stockyards.

Photo Researchers

tional Big-Game Refuge, in north-central Nebraska, is reserved for elk, Texas longhorn cattle, and buffalo. Among the State parks is Arbor Lodge State Park, the home of J. Sterling Morton (1832–1902), originator of Arbor Day. Among other places of interest in Nebraska are Boys Town, near Omaha, a refuge for homeless boys; and the cabin and cave of John Brown (q.v.), near Nebraska City, a station on the Underground Railroad for Negro slaves. The State capitol, in Lincoln, designed by Bertram G. Goodhue (q.v.), is an architectural landmark.

Sports. Nebraska offers fishermen many miles of streams and rivers, and numerous lakes. Trout are found in the n.w. Other species found throughout the State are walleye and northern pike, white bass, crappie, bluegill, catfish, sauger, paddlefish, and sturgeon. Game animals and birds hunted include white-tailed and mule deer, antelope, jackrabbit, cottontail rabbit, fox squirrel, bobwhite quail, ring-necked pheasant, and sharp-tailed grouse.

THE PEOPLE

According to the 1970 decennial census, the population of Nebraska was 1,483,791, an increase of 5.1 percent over the 1960 population. As calculated by the Census Bureau, the urban segment comprised 912,760 persons, 61.5 percent of the total, compared with 54.3 percent in 1960. The rural segment comprised 570,733 persons, 38.5 percent of the total, compared with 45.7 percent in 1960. Ethnically, the 1970 population was distributed as follows: white persons, 1,432,867; nonwhites, 50,626, including 39,971 Negroes, 6624 Indians, and a sprinkling of Japanese, Chinese, Filipinos, and others. The percentage of native-born residents in 1970 was 98.1; of foreign-born, 1.9. The major countries of origin of the foreign-born, in order of rank, were Germany, Great Britain, and Sweden. Population density in 1970 was 19.4 per sq. mi.

The chief cities are Lincoln, the capital and second-largest city, an insurance center and grain market and the site of the University of Nebraska; Omaha, the largest city, a major rail hub and center of agricultural processing and marketing; Grand Island, the third in size, a rail and distribution center for a farming region;

Hastings, the center of a farming and livestock-raising area; and North Platte, an agricultural distribution center.

Indians living in Nebraska include members of the Omaha, Ponca, Santee Sioux, Winnebago, Iowa, Sac, and Fox tribes, who occupy reservations bearing the tribe names.

Education. The public-school system of Nebraska was established in 1855. Education is free and compulsory for all children between the ages of seven and sixteen.

ELEMENTARY AND SECONDARY SCHOOLS. In 1970 public elementary schools numbered about 1580 and public secondary schools, about 425. Enrollment in 1971 was about 231,000 in elementary and about 102,000 in secondary schools. Teachers in the public-school system in 1972 numbered about 8935 in elementary and about 7950 in secondary schools. In 1970 private institutions included about 245 elementary schools and about 65 secondary schools; enrollment in 1971 was about 32,000 elementary and about 13,000 secondary students. Teachers in private schools numbered about 2250 in the mid-1960's.

UNIVERSITIES AND COLLEGES. In 1970 Nebraska had twenty-seven institutions of higher learning, sixteen of which were private. Enrollment totaled 16,000. Public institutions include the University of Nebraska, with campuses in Lincoln and Omaha; State colleges at Chadron, Kearney, Peru, and Wayne; and junior colleges at Norfolk, Fairbury, North Platte, McCook, and Scottsbluff. Private institutions include the College of Saint Mary, Creighton University, Dana College, Doane College, Hastings College, Midland Lutheran College, Nebraska Wesleyan University, Union College, and York College.

Cultural Institutions. Museums in Nebraska include the Oregon Trail Museum, in Gering, displaying paintings of the pioneer migrations; the Stuhr Museum of the Prairie Pioneer, in Grand Island; the House of Yesterday, in Hastings, with the largest array of Great Plains material in one collection; the Nebraska State Historical Society, which has displays on the Central Plains Indians and pioneers of the area, and the Sheldon Art Gallery, both in Lincoln; and the Joslyn Art Museum, in Omaha.

THE ECONOMY

Nebraska has a diversified economy, strongly dependent upon agriculture. Per capita personal income was \$6240 in 1976, compared with \$6441 for the U.S. as a whole. Agriculture employs some 17 percent of the State's workers. Nonagricultural workers are employed, in descending order of numbers, in wholesale and retail trade; government; service industries; manufacturing;

transportation and public utilities; finance, real estate, and insurance; and construction. In common with the other States of the west north central region, Nebraska was affected by the low agricultural output and prices of the mid-1970's, but it maintained its population. Omaha showed a population increase of 7 percent in the period 1970-77, while metropolitan and industrial areas elsewhere showed lesser increases or decreases. The State has a small working-age population and a relatively large group of citizens aged 65 and over, in proportion to these groups in the U.S. as a whole.

Manufacturing. According to a recent survey of manufactures (1975), production workers in Nebraska total 62,500; the largest groups are employed in the processing of food, primarily meat-packing, and in the manufacture of non-electrical machinery and electrical equipment. About 38 percent were employed in the Standard Metropolitan Statistical Area (S.M.S.A.; q.v.) of Omaha. Other major manufacturing centers were Lincoln and Sioux City. In the mid-1970's the annual value added by manufacture (see **VALUE**) in the largest industries totaled \$859,400,000 for food and food products, \$268,200,000 for nonelectrical machinery, and \$224,000,000 for chemicals and allied products. The annual value added by all manufacturing industries during the same period amounted to about \$2.39 billion.

Agriculture. Nebraska ranks sixth among the States in cash receipts from agricultural production. About 117,000 persons (including both operators and workers) are employed on 68,000 farms covering some 48,000,000 acres and averaging about 706 acres each. Major products are, in descending order of value, cattle, corn, hogs, and wheat. Other important crops include hay and sorghum grain. Annual cash receipts from farming in the mid-1970's totaled about \$3.9 billion, including \$2.18 billion from livestock and \$1.69 billion from crops. In the mid-1970's Nebraska ranked third in the U.S. (after Texas and Iowa) in marketings of beef cattle, and was among the five leading States in production of sorghum grains and corn for grain. It was among the ten principal States in hog production.

Mining. The chief mineral products of Nebraska are petroleum, cement, sand and gravel, and stone. Mineral production in the mid-1970's was valued at about \$112,000,000 annually, ranking Nebraska fortieth among the States.

Energy. Generating plants in Nebraska, with a capacity of 3,900,000 kw, produced about 13.3 billion kw hours of electric energy annually in the mid-1970's. All of the capacity and produc-



Nebraska tomatoes, raised and irrigated under the Culbertson Canal Project, are loaded on a truck for shipment to a cannery. U.S. Bureau of Reclamation

tion were publicly owned. There were also two utility-operated nuclear reactors.

Forestry. The forest land of Nebraska consists of about two thirds hardwoods and one third softwoods. The forest land, primarily under private ownership, comprises some 1,023,000 acres. It produces a net cut of sawtimber of some 52,000,000 bd.ft.

Tourism. Income from tourists in Nebraska is estimated at some \$550,000,000 annually. The most popular tourist attractions are in the s.e. part of the State, including the Omaha-Lincoln area, and s.w. Nebraska, with many large reservoirs and historic sites.

Transportation. The first railroad in Nebraska was the Union Pacific Railroad, which was inaugurated on Sept. 22, 1865. Currently, the State has about 5360 mi. of track. Rural and municipal roads total some 97,100 mi.; Federally aided primary and secondary roads total about 23,938 mi., including 483 mi. in the Interstate Highway System. Nebraska is served by 4 international and 4 local or interstate airlines; the State has 94 public and 202 private airports. Omaha, on the Missouri R., is the only major port in the State. Omaha is also an important railroad and airline hub. Its grain storage facilities and livestock markets are among the largest in the country.

Communications. The first newspaper in Nebraska was the *Nebraska Palladium and Platte Valley Advocate*, founded in Bellevue in 1854. The State in 1976 had nineteen daily newspapers with a total circulation of 491,000, and four Sunday papers with a total circulation of 367,000. Among the leading papers were the Omaha *World-Herald* and the Lincoln *Star and Journal*. The *Nebraska Farmer*, a semimonthly journal published at Lincoln, has wide circulation. Of

some 87 radio stations operating in the mid-1970's, among the oldest was WOW in Omaha, established in 1923 as WAOW. Television stations numbered 23.

GOVERNMENT

Nebraska is governed under the constitution of 1875, as amended. Executive authority is vested in a governor, a lieutenant governor, an attorney general, and a secretary of state, a treasurer, and an auditor, all elected for four-year terms, and other elected and appointed officials. Legislative authority is exercised by the Senate with forty-nine members, the nation's only unicameral legislature, which meets annually. The judicial system includes a seven-member supreme court, district courts, and various lesser courts.

Nebraska is represented in the United States Congress by two Senators and three Representatives.

Local Government. The State is divided into ninety-three counties, which are of two types: townships or supervisor county (twenty-eight); and precinct or commissioner county (sixty-five). Chief county officials include commissioners, supervisor, clerk, judge, and sheriff. Major forms of municipal government are the commission, mayor-council, and city-manager types.

Voting Qualifications. Suffrage is extended generally to U.S. citizens eighteen years of age who meet the residence requirements (six months in the State, forty days in the county, and ten days in the election district).

HISTORY

The Spanish explorer Francisco Vázquez de Coronado (q.v.) in 1541 is believed to have been the first European to see the area that is now Nebraska. In 1720 Colonel Pedro de Villasur, a Spanish soldier, led an expedition into Nebraska; he and his party were massacred by Indian tribes. The French controlled the territory from 1700 to 1763, when it was ceded to Spain. In 1803 Nebraska became a United States possession as a result of the Louisiana Purchase (q.v.). Between 1804 and 1806 the Lewis and Clark Expedition (q.v.) explored a portion of the territory. In 1807 Manuel Lisa (1772-1820), of Spain, established a trading post and became the first permanent white settler in the area. In 1810 the American Fur Company established a post at Bellevue. In 1819 Fort Atkinson was established on what is now the site of Fort Calhoun.

The Oregon and California trails led through Nebraska, and these routes to the West were responsible for the gradual settlement of the region despite the fact that in 1834 the Federal

A mother bravely baits her son's fishhook with a wiggling worm. The scene is at Harry Strunk Lake, near Stockville, in southwestern Nebraska.
U.S. Bureau of Reclamation



government had declared Nebraska part of the "Indian Country" from which all white men were excluded. Nebraska was successively part of the territories of Indiana, Louisiana, and Missouri. On May 30, 1854, it became the Territory of Nebraska.

Statehood. Immigration to the territory increased with the passage of the Free Homestead Act (see HOMESTEAD LAWS) in 1862. On March 1, 1867, Nebraska achieved Statehood, and the capital was established at Lincoln. In 1867 the Union Pacific became the first railroad to cross the State. Because the economy of Nebraska has always depended upon agriculture, agrarian movements have been important. The Grange (see NATIONAL GRANGE) was strong in the 1870's, and the Farmers' Alliances (q.v.) in the 1880's.

After 1890 farm prices soared as Nebraska began to irrigate crops. But during the Great Depression of the 1930's many farmers, unable to meet mortgage payments, lost their property. Agricultural output rose again after World War II with the Federally assisted construction of flood control dams to aid Nebraska and other States drained by the Missouri R. As scientific methods increased, farms became larger and fewer, thus reducing the need for farm workers, many of whom moved to cities. This shift was partially offset by the development of several oil fields, which stimulated rapid economic growth.

Although Nebraska remains heavily dependent on its increasingly mechanized agriculture, the urban population continues to expand. Nebraska has, therefore, redoubled its efforts to attract new industries and, simultaneously, to satisfy the demands on its social services.

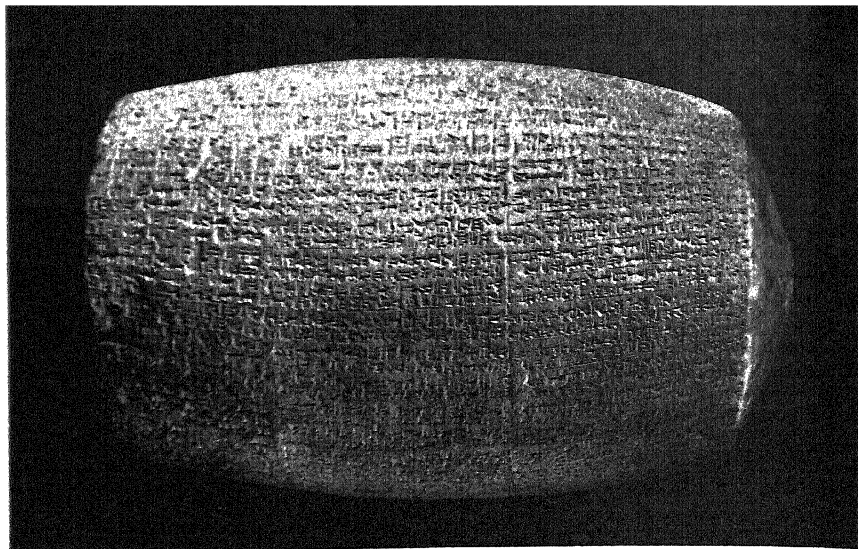
NEBRASKA, THE UNIVERSITY OF, coeducational State-controlled land-grant (see LAND-

GRANT COLLEGES) institution of higher learning, with campuses in Lincoln and Omaha, Nebr. The University of Nebraska campuses in Lincoln, founded in 1869, comprise colleges of agriculture, arts and sciences, business administration, dentistry, engineering and architecture, home economics, law, pharmacy, teacher education, and a graduate college, and schools of graduate social work, journalism, and music. The university confers the degrees of bachelor, master, and doctor. The Lincoln campuses include the library, housing over 1,000,000 bound volumes, and the Center for Continuing Education, and administers 15,000 acres for agricultural research around the State. In 1970 the enrollment exceeded 20,000 and the faculty 1000.

The University of Nebraska at Omaha, formerly Municipal University of Omaha, was founded in 1908 and became part of the university system in 1968. It comprises colleges of arts and sciences, engineering and technology, business administration, teacher education, continuing studies, and a graduate college, and confers bachelor's, master's, and preprofessional degrees. In 1970 its library contained about 270,000 bound volumes; students numbered about 13,000 and the faculty, 390.

Also in Omaha, The University of Nebraska Medical Center, founded in 1881 as Omaha Medical College, comprises a college of medicine and school of nursing. In 1970 its library contained about 29,000 bound volumes, the students numbered about 1000 and the faculty, 800.

The university is noted for its correspondence school, which enrolls some 20,000 students annually; The University of Nebraska Press, publisher of the quarterly *Prairie Schooner*; and educational television station KUON-TV.



Babylonian clay cylinder of Nebuchadnezzar II, with writing in cuneiform. University of Pennsylvania Museum

NEBUCHADNEZZAR or **NEBUCHADREZZAR**, name of two kings of Babylonia.

Nebuchadnezzar I (r. 1146–23 B.C.), king of second dynasty of Isin. His reign was marked by warfare between Babylonia and the kingdoms of Elam and Assyria (qq.v.).

Nebuchadnezzar II (r. 605–562 B.C.), second king of the Chaldean dynasty of Babylonia, son of Nabopolassar (r. 625–605 B.C.). In the last year of Nabopolassar's reign, the surge of Egyptian power under Pharaoh Necho II (r. 609?–593 B.C.) into Palestine and Syria threatened the Babylonian Empire; see **BABYLONIA**.

In 605 B.C., acting under Nabopolassar's orders, Nebuchadnezzar invaded Syria and defeated Necho II at Carchemish. The defeat caused the Egyptians to abandon Syria and Palestine and to withdraw into Egypt. Nebuchadnezzar became king of Babylonia in the same year and proceeded against Palestine, which, under Jehoiakim, King of Judah (609–598 B.C.), at first recognized and later rebelled against Babylonian hegemony. In 597 B.C., after a siege in which Jehoiakim was killed, Nebuchadnezzar captured Jerusalem and took as prisoners into Babylonia many Jews, including King Jehoiachin (615?–560? B.C.), who had succeeded his father Jehoiakim. Nebuchadnezzar then placed Jehoiachin's uncle Zedekiah (q.v.) on the throne of Judah. Zedekiah led a revolt against the Babylonians in 588, and for a second time Nebuchadnezzar laid siege to Jerusalem. After sixteen months the city fell; Nebuchadnezzar destroyed

Jerusalem and again carried great numbers of Jews into exile in Babylonia. The two captivities to which the Jewish people were subjected, especially the captivity after the destruction of Jerusalem, are known as the Babylonian Captivity (q.v.).

Nebuchadnezzar's reign was marked by two additional important military campaigns: a thirteen-year successful siege of the city of Tyre, which had revolted against him; and a campaign against the Egyptians in 568. In domestic affairs his reign was distinguished by the construction of canals throughout Babylonia and by the rebuilding of the city of Babylon (q.v.), in which he erected palaces and temples. According to the story in the book of Daniel (q.v.) in the Old Testament, Nebuchadnezzar for a time suffered from a form of insanity in which he imagined himself an ox and ate grass. He was succeeded as king of Babylonia by his son Evil-Merodach (r. 562–560 B.C.).

NEBULA, in astronomy, conglomerate of gaseous and finely divided dust particles existing in interstellar space; see **ASTRONOMY**. Before the application of the telescope (q.v.) to the science of astronomy, many objects that are now known to be star clusters were erroneously believed to be nebulae. With the aid of powerful telescopes, however, individual stars in a cluster could be identified. Nebulae were originally classified as anagalactic or galactic, depending on whether they are without or within our Galaxy (q.v.). Anagalactic nebulae are now considered to be extragalactic systems, containing spirals and associated structures. Galactic nebu-

lae are subdivided into planetary nebulae and diffuse nebulae. See PLANET.

Planetary nebulae, or planetaries, are so called because many of them have a definitely outlined shape and resemble planets in appearance. Many planetaries have an elliptical outline and rotate about the shorter axis of the ellipse (q.v.). The Ring Nebula of the constellation Lyra, a typical planetary, has a rotational period of 132,900 years and a mass calculated to be about fourteen times that of the sun (q.v.). Hot white and blue white stars can be observed at the center of many planetaries. About 150 planetaries have been discovered.

Diffuse nebulae are extremely large structures (their dimensions are given in light years) with no definite outline of shape and a tenuous, cloudlike appearance. Diffuse nebulae are either luminous or dark. Luminous nebulae are made lustrous by the light of neighboring stars. They include some of the most striking objects in the sky, such as the Great Nebula in the constellation Orion and the Network Nebula in the constellation Cygnus. Unlike the planetaries, they exhibit no regularity of motion, such as rotation of the mass about an axis; the tremendous streams of matter in the diffuse nebulae are intermingled in violent, chaotic currents. Several thousand luminous nebulae are known. Spectral studies of luminous nebulae show that the light emanating from them consists of reflected light from stars and also of radiation from the nebulae themselves; see SPECTRUM. Two

bright lines in the spectra which do not correspond to any lines received from terrestrial or solar elements were believed to be caused by a new element, which was named nebulium. The lines were later found to be caused by oxygen atoms radiating under extreme conditions that have not been duplicated in a laboratory.

Dark, diffuse nebulae are seen as nonluminous clouds or faintly luminous, obscuring portions of the Milky Way (q.v.). Astronomers originally believed the dark lanes in the Milky Way to represent the absence of stars, but it is now known that the stars are obscured by dark nebulae. The longest dark rift observed on photographic plates of the star clouds of the Milky Way is a succession of dark nebulae extending from the Northern Cross in Cygnus to the constellation Sagittarius.

See separate articles on the constellations mentioned in this article. See also STARS; ZODIAC.

NEBULAR HYPOTHESIS. See COSMOGENY.

NECK. See SPINAL Column: *Anatomy and Physiology*.

NECKAR, one of the largest tributaries of the Rhine R. and the principal river of Baden-Württemberg State, West Germany. Rising in the Black Forest (q.v.), near Schwenningen, the Neckar has a winding, northerly course of 228 mi., and joins the Rhine at Mannheim.

NECKER, Jacques (1732–1804), French financier and statesman, born in Geneva, Switzer-

A spiral nebula, viewed edge-on, in the constellation Virgo.
Mount Wilson & Palomar Observatories



NECROPSY

land. He entered a Paris banking firm as an apprentice in 1747, and subsequently improved his financial position and his knowledge of financial operations to such an extent that in 1762 he was able to establish his own bank. During the ensuing decade he became a director of the East India Company (q.v.) of France. In 1775 he wrote a notable economic study, "Essai sur la Legislation et le Commerce des Grains" ("Essay on Legislation and the Grain Trade"), in which he attacked the free-trade policies instituted by the controller general of finance, Anne Robert Jacques Turgot (q.v.). Necker was appointed to succeed Turgot in 1776 and introduced a number of financial reforms, including a more equitable system of taxation and a plan for the funding of the national debt. In 1781 he completed the *Compte Rendu* ("Account Rendered"), a comprehensive report on the national finances. Later in the same year Necker was dismissed by Louis XVI (q.v.), King of France, partly because the king disapproved of his Protestantism, and partly because Necker had angered Queen Marie Antoinette (q.v.) by preventing her from carrying out certain extravagances through his insistence on economic retrenchment. In 1788, when Necker was reappointed, he was acclaimed by the populace as the only man capable of restoring sound administration to the disordered French financial system. In the following year his popularity was further increased when he recommended to the king that the Estates-General, which had not met since 1614, be convened. The adoption of various radical proposals by that body caused Louis XVI to dismiss Necker again; this act was the immediate cause of the storming of the Bastille (q.v.) by the aroused populace of Paris on July 14, 1789. Shortly thereafter Necker was again recalled by the king, but he was unable to resolve the crisis and resigned in September, 1790, to live in retirement on his estate at Coppet, Switzerland, until his death.

NECROPSY. See AUTOPSY.

NECTAR, in botany, sugary liquid built up in plant glands, called nectaries, situated at the base of the petals in flowers, or in so-called extrafloral nectaries borne on petioles. Nectar is used as food by many insects which, in the course of nectar gathering, carry pollen from flower to flower, thereby serving as fertilizing agents. Because many wasps and bees use nectar in making honey (q.v.) nectar is sometimes erroneously called honey.

NECTARINE, smooth-skinned fleshy fruit, *Prunus persica*, var. *nectarina*, which is a variety of the common peach (q.v.). The nectarine dif-

fers from the common peach in skin texture, aroma, and flavor, but closely resembles the peach in color, and in size and shape of seed. It arises as a variation of the peach tree; peach seeds occasionally give rise to trees which bear nectarines, and nectarine seeds may give rise to trees bearing either peaches or nectarines. Because it is impossible to foretell which type of tree will result from the planting of a nectarine seed, orchardists attempting to grow nectarines take buds from branches on which nectarines have grown and graft these buds on peach trees; see BUDDING. Nectarines are grown extensively for commercial purposes in California.

NEEDHAM, town of Massachusetts, in Norfolk Co., about 10 miles s.w. of Boston, of which it is a residential suburb. The principal industries are the manufacture of textiles and electrical equipment. Needham was settled in 1680, and was part of Dedham until 1711, when it was set apart and incorporated as a separate town. Pop. (1960) 25,793; (1970) 29,748.

NEEDLE, one of the oldest implements used by man. Some primitive people still do their sewing with awls of bone or of thorns or make needles of iron or steel, with a constriction under the pinlike head around which the end of the thread is tied.

The Chinese are believed to have been the first to use needles of steel, and these implements gradually found their way westward until they were brought into Europe by the Moors (q.v.). By 1370 the needlemaking industry was established in Nuremberg, Germany. In England during the reign of Queen Elizabeth I (q.v.), the manufacture of needles was taken up on a considerable scale in small shops; after 1650 it gradually developed until the manufacture of hand-sewing needles became an important industry in England, and later in Germany.

Subsequent developments included the introduction of the needle with the eye and the gradual development of machines for the manufacture of needles. One such machine, introduced in 1785, produced a steel rod from which two joined needles were formed. The first drill-eyed needles were made in 1826 on a stamping machine, but the mechanical process for the production of needles was not fully developed until 1885.

NEEDLEWORK, handwork, other than standard sewing, done with a needle; see EMBROIDERY; KNITTING; LACE.

NÉEL, Louis Eugène Félix (1904-), French physicist, born in Lyon, and educated at the École Normale Supérieure, Paris, and the University of Strasbourg. From 1928 to 1945 he

taught and did research at Strasbourg, and in 1945 he became director of the national school of electrotechnology, hydraulics, radioelectricity, and applied mathematics at the University of Grenoble.

Néel specialized in the field of magnetism (q.v.), and his researches led to important theories on the interaction of magnetic materials within solid substances. His work made an enormous impact on the development of computers and data-processing equipment, and radio, television, and other telecommunications technology; see **COMPUTER**; **DATA PROCESSING**. He also developed magnetic materials called antiferromagnetism and ferrimagnetism that are unbalanced chemically and are thus able to withstand very high temperatures.

During World War II, Néel devised an effective method of protection for French shipping against floating magnetic mines; see **MINE**. He has published more than 200 scientific papers and shared the 1970 Nobel Prize in physics with the Swedish physicist Hannes Olof Gösta Alfvén (q.v.).

NEFERTITI. See **EGYPTIAN ARCHITECTURE AND ART: Sculpture**; **IKHNATON**.

NEGEV or **NEGEB**, desert region of the Middle East, comprising the s. half of Israel. The Negev covers an area of about 5000 sq.mi. and is shaped like an inverted triangle, with the apex in the s. at the head of the Gulf of 'Aqaba, and the base in the n., extending e. from the Gaza Strip (see **GAZA**) to about halfway up the w. coast of the Dead Sea (q.v.). Geographically the Negev is divided into four regions: a coastal plain in the n.w., a central plateau, a mountainous area in the south-central portion, and a valley in the e. The average annual rainfall is less than 10 in., and although the soil in the n. is fertile, irrigation is necessary for agriculture. In

1964, a conduit extending more than 100 miles s. from Lake Tiberias began pumping water into the n.w. region of the Negev. The main crops of this area are barley, wheat, and citrus fruit. The Israeli government also began a project to provide desalinated water to the s. Negev. Surveys elsewhere in the region have revealed commercially important deposits of phosphates, copper, mica, fluorite, chrome, natural gas, petroleum, sulfur, kaolin, manganese, feldspar, and glass sand. The area is largely uninhabited except for nomadic Arab tribes. The largest cities in the region are Beersheba (q.v.) in the n. and the port of Elath on the Gulf of 'Aqaba. In recent years the government has founded towns in the Negev including Yeroham (1951), Dimona (1955), and Arad (1962).

History. During the pre-Christian era the Negev was inhabited successively by various Semitic tribes. Towns and agricultural villages were developed, principally in the northwest, with the aid of irrigation. Later, military outposts and trading settlements were built along caravan routes from cities in the north to Egypt and Arabia. After the Arab conquest of the region in the 7th century A.D., the towns were abandoned and fell into ruins. The Negev remained an isolated desert for centuries thereafter. By the terms of the United Nations partition of Palestine into separate Arab and Jewish states in 1947, most of the region was awarded to the Jewish state. Egyptian troops invading the Negev in 1948 were defeated by forces of the newly proclaimed Israeli government. In 1949, by terms of an armistice, all of the Negev remained under Israeli control except for the Gaza Strip, which was retained by Egypt. The Gaza Strip was occupied briefly by Israel during 1956–57 and more permanently as a result of the 1967 Arab-Israeli war. See **ISRAEL: History**.

Wavy rills, engraved by the wind, give a cultivated appearance to sand dunes in the Negev.

Israel Office of Information



NEGLIGENCE

NEGLIGENCE, in the law of torts (see TORT), term used to designate a failure to exercise due care, resulting in injury to another, and for which an action for money damages (q.v.) may be brought. The failure to exercise due care may be the omission to perform an act that a reasonable man, guided by those circumstances that normally regulate the conduct of individuals, would perform, or it may be the commission of an act that a reasonable man would not commit, or that he would perform in a more careful manner with due regard for the safety of others. Negligence implies that the careless conduct was in violation of a legal duty, as, for example, the duty of a railroad engaged in the business of transporting passengers to maintain its roadbed and rolling stock free from dangerous defects.

The circumstances under which persons act are so various that proper care in one situation may be negligence in another. Thus, a person is under no duty to keep his premises safe for persons who trespass thereon; in some States of the United States, however, the owner is held liable for injuries to child trespassers for not keeping a device such as scaffolding or a revolvable platform properly guarded, on the ground that such a device is an invitation to children to trespass and play on it. In all States, the owner of property is liable to a person whom he permits to enter his premises and who sustains injuries resulting from defects known to him, and of which he failed to give warning. The owner is liable also for injuries sustained by a person whom he has invited on the premises if he does not use ordinary care to see that the premises are reasonably safe.

The law does not presume negligence in any situation. Instead, it places the burden of proving the fact of negligence upon the party who alleges that another has been negligent. For example, a person who suffers a fractured leg as a result of an automobile accident must show that the injury was incurred through the fault of the driver of the automobile. Moreover, the injured person must show he did not contribute to causing the accident, as by failing to exercise due care in crossing the street. In general, unless the fault is exclusively on the part of the defendant, the plaintiff has no cause of action for his injuries. In some States, however, the doctrine of comparative negligence may apply, whereby a plaintiff negligent to some degree may recover damages to some degree.

On occasion, the situation of the parties when injury occurs is such as to overcome the ordinary presumption of care on the part of the defendant. To such a situation, the maxim *Res*

ipsa loquitur ("The thing speaks for itself") is applied. If a railroad train jumps the tracks or a crate of goods falls out of a warehouse window, the situation, in each instance, would be one that could not ordinarily occur if the railroad company or the warehouseman had exercised due care. The presumption of due care on the part of the defendant is therefore overcome, and judgment will be granted for any resulting injury unless the defendant shows that, notwithstanding these appearances, the injury was not his exclusive fault.

Even when it is shown that the defendant has been guilty of negligence, the plaintiff may fail in his action because he cannot show that he has sustained legal harm as the direct result of such negligence. A striking illustration of this rule is afforded where one is made sick by a nervous shock resulting from another's negligence, as when, by fault of a railroad company, a car catches fire and several passengers are so badly frightened that for weeks thereafter they are ill and confined to their beds. According to the prevailing doctrine in Great Britain and in the U.S., they have no cause of action against the company; in only a few jurisdictions is mental anguish, without consequent or attendant physical injury, deemed legal damage. It is generally held, however, that if the negligence of the defendant causes injury to one's body, recovery may be had for the pain and suffering incident thereto.

In some cases an individual may also be guilty of criminal negligence, as where he violates a statute that creates a specific duty and the tort is committed during the period of such violation. For example, a statute requiring the operation of an automobile at a limited speed in a school zone during school hours is violated when the car is driven at an excessive speed during those hours; if a child is injured as a result of such violation, the driver of the car is liable civilly for damages, and is also liable criminally to fine or imprisonment for his negligence. See MANSLAUGHTER.

NEGOTIABLE INSTRUMENTS, in law, contracts in writing that are transferable by indorsement or by delivery, and to which the holder takes title free from any defenses or objections to their validity that might have been good against the transferor. As defined under laws enacted in all States of the United States, they comprise promissory notes and bills of exchange. In order to be negotiable, an instrument must meet several qualifications. It must be in writing; it must contain an unconditional promise to pay a certain sum in money, on demand

or at a fixed and determinable future time; it must be made payable to bearer or order; and it must be signed by the maker of a promissory note or the drawer of a bill of exchange.

NEGRILLO. See *AFRICA: The People: Ethnology*; *PYGMIES*.

NEGRITO. See *RACES OF MANKIND: Racial Classification: Negroid Race*.

NEGRO, in physical anthropology, general term for a member of the dark-skinned racial subdivision of mankind indigenous to tropical Africa and parts of southeastern Asia and Oceania. More narrowly, the term is applicable to certain peoples in western, central, and southern Africa, such as the Forest Negroes, and to most natives of Sudan, the Nile R. regions, and northeastern Africa, including the Hamitic or Ethiopian Negroes.

The word Negroid designates other groups with related physical characteristics, such as the Bushman and Hottentot peoples of South Africa, the Melanesian-Papuans of Oceania, and the pygmies of central Africa, southeastern Asia, and Oceania. The African pygmies are called Negrillos; the Asian pygmies are called Negritos.

In the Western Hemisphere the term Negro refers to a separate group of people, a composite subrace comprised of Forest Negro, Caucasoid, and sometimes American Indian strains. It is often used pejoratively, however, as a means of expressing social prejudice. In such circumstances the person referred to need have relatively little Negroid ancestry. Some of the dark-skinned peoples, such as the aborigines of interior Australia and certain ethnic groups in India, are not classified as Negroid; though they have Negroid traits, they are basically Caucasoid.

Physical Characteristics. Most Negroes are characterized by dark skin, dark-brown eyes, dark, tightly curled hair, prominent jaws, flat, broad nose, thick, protruding lips, and scant body hair. The dark coloration is caused by large quantities of melanin (q.v.), a skin pigment present in different degrees in all people. Negroid peoples have a greater density of sweat glands on the skin surface than do other races; because this characteristic is correlated with tropical and subtropical environments, many anthropologists believe it to be an evolutionary adaptation for providing protection from the excessive heat. Similarly, the broad Negroid nose is considered to be the result of an adaptive mechanism for breathing hot and humid air. The South African Bushmen and Hottentots have large deposits of fat on the buttocks and upper thighs (*steatopygia*) which may have developed as a means of food storage.

Any assumption that the Negro represents a lower evolutionary status because of his longer arms, flattened nose, and protruding jaw is totally unjustified: a similar argument could be advanced for the white man on the basis of his anthropoidlike thin lips, straight hair, and abundance of body hair. Those who suggest that the Negro is primitive often argue that he is inferior in intelligence and culture to other races. This argument is indefensible when one considers the many Negroes of high intellectual prominence. Much race prejudice developed when studies of anthropologists and biologists were misinterpreted; there is no proof of a correlation between race and intelligence.

Origins and Distribution. The exact origins and interrelationships of the world's Negro populations are not fully known; this is one of the major problems in physical anthropology. Because the greatest concentration of peoples with typically Negroid characteristics is in Africa south of the Sahara desert, it seems probable that this area is the source of Negro origins. These people are so widely distributed, however, that some anthropologists believe that they may have originated in southeastern Asia, and subsequently spread to Africa and Oceania. The Negritos, too, are scattered over a wide area, and theories differ regarding their origins. They may have inhabited southeastern Asia during prehistoric times, and migrated to their present locations, or they may have moved from Africa to southern Asia. Whether the Negroes and the Negritos have a common ancestry is not known, but the physical similarities indicate some generic relationship. The Negroid Melanesian-Papuans of Oceania probably represent a composite subrace whose basic Negroid characteristics, less marked than those of African Negroes, were acquired from Negrito ancestors who intermarried with Caucasoid and Mongoloid peoples. The Bushmen of the Kalahari Desert and the Hottentots of southwest Africa were probably driven into their present areas centuries ago by Bantu-speaking Forest Negroes, who introduced agriculture and iron metallurgy to the region. Pleistocene skeleton remains indicate that the Bushmen had previously occupied much of South Africa. The Bushman and Hottentot peoples have many Mongoloid characteristics, such as yellowish skin, epicanthic eye folds, and prominent cheekbones. These Mongoloid features may be either parallel developments or indicative of Mongoloid ancestry; however, the closest extant Mongoloids are so far removed geographically that hybridization seems unlikely.

NEGRO-AMERICAN FOLKLORE

Cultural Variations. It is practically impossible to define an overall Negro culture, for the Negroid peoples, throughout the world, have widely disparate cultures. The Bushmen and Negroes have simple hunting and gathering economies, whereas the Negroes of eastern Africa are typically cattle herders. Most of the African Forest and Oceanic Negroes are agricultural. When Europeans first began to penetrate the African continent they found a number of native states with highly complex social and political organizations. Nevertheless, many Negroes of the Eastern and Western hemispheres subsequently adopted European cultures.

The languages spoken by Negroid peoples include many African languages (q.v.) as well as Asian and Oceanic languages, including those of Melanesia, Austronesia, Polynesia, and Indonesia; see separate entries for languages of these places. English, Spanish, and French, for example, have also been adopted by many Negroid peoples. See RACES OF MANKIND: *Negroid Race*; NEGROES IN THE UNITED STATES. W.C.G. **NEGRO-AMERICAN FOLKLORE**, large and diversified body of anecdotes, ballads, fables, folk tales, legends, myths, and superstitions belonging to the culture of the Negro American. Some features of Negro-American folklore are distinctively African in their derivation, while others are taken from the popular traditions of the larger society.

The Negro American, like his African ancestors, assigns to animals a dominant role in his folk stories. The animals are made to think, talk, and behave like human beings, and are endowed with great cleverness. This species of tale is well exemplified in the *Uncle Remus* tales by the American author Joel Chandler Harris (q.v.). Harris based his stories on authentic folk material collected among Negroes of the South. Black Uncle Remus, old and full of stories, amuses his employer's young son with the droll and exciting adventures of Br'er (Brother) Rabbit, Br'er Wolf, and Br'er Fox. The animals are portrayed in a series of encounters with Tar Baby, a doll or manikin made of tar. Before Harris wrote down these animal folk tales in his *Uncle Remus* series they were isolated in Negro-American folklore; today people of all races enjoy them.

Another class of Negro-American folk tales is that which has to do with work and working conditions. An excellent example of this class is the story of John Henry, a powerfully built Negro laborer employed as a spike driver in the construction of a railroad. Most of the ballads and fables relating to John Henry center about

the memorable contest in which he pitted his strength against a steam-operated spike driver. John Henry drove more spikes than did the machine, but in outdoing the machine he overexerted himself and died "with his hammer in his hand". In an alternate version of the story John Henry was a dock hand who beat a steam winch in hoisting bales of cotton from the wharf onto a riverboat.

A third type of story found in the folklore of the Negro American is that which tells of some deeply affecting affair or event, usually tragic or catastrophic. Such stories are often cast in the form of a ballad or a lament, and have close affinities with the distinctive Negro musical idiom known as the blues; see JAZZ: *The Afro-American Heritage*. This type of story is commonly misconceived to be about faithless love, but in fact there is no single representative type, for the content is extraordinarily varied. Many are melancholy tales about faithless love, for example, the well-known song "Careless Love". Many more, however, cover almost the full range of Negro-American rural and city life, telling, for example, of hard luck, loneliness, natural catastrophes (such as floods), railroad wrecks, war, and life in the northern cities. In addition to the foregoing, Negro-American folklore incorporates a wide variety of prison songs, "preacher tales", sermons, gospel songs (see HYMN), ghost stories, voodoo tales, and black-magic lore.

See also BALLAD; FABLE; FOLK MUSIC; FOLK TALES; MAGIC OR SORCERY; MYTHOLOGY; NEGROES IN THE UNITED STATES; SPIRITUAL; VODOO.

NEGROES IN LATIN AMERICA AND THE CARIBBEAN AREA, Negro (q.v.) population of those portions of the Western Hemisphere generally located south of the United States. Over 10 percent of the more than 200,000,000 people living in Latin America and on islands of the Caribbean claim African heritage. Negroes are concentrated in the Caribbean islands and nearby mainland of South America, constituting a majority of the population of Haiti (95 percent), Jamaica (78 percent), and Barbados (89 percent); and forming a significant minority in British Honduras (33 percent), Puerto Rico (20 percent), the Dominican Republic (15 percent), Nicaragua (15 percent), Trinidad and Tobago (43 percent), Guyana (31 percent), and Brazil (11 percent). Most people in the French Antilles claim African heritage, but Negroes compose 5 percent or less of the population elsewhere in the area.

Greater numbers of people in Middle America and South America have African heritage than this survey suggests. Africans have inter-

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married with Europeans, Amerindians, and Asians. For example, 48 percent of Caribbean Negroes claim purely African origins and another 43 percent claim some African background. In the Dominican Republic 70 percent of the people report a mixed heritage; 46 percent of Surinamese, 26 percent of Brazilians, and 65 percent of Venezuelans and Colombians make the same claim. Negroes have disappeared from the racial statistics of Costa Rica, Honduras, Panama, and Peru.

Settlement patterns of Negroes in Latin America and the Caribbean area have rested on intermittent migration for more than 400 years. Demands for slave labor in the 16th century brought West Africans to the Caribbean islands and Brazil; see **SLAVERY**. European slave traders then dispersed them to areas where the economy rested on plantation agriculture, mining, or coastal industries. After the abolition of slavery, Negroes migrated to Panama, Central America, and Peru. Others traveled between Jamaica, Haiti, and Cuba, and most of the migrants remained in their new homes.

Social Structure. The social position of Negroes in Latin America and the Caribbean area is influenced not only by skin color but also by occupation, location, education, wealth, and family prestige. Most Negroes, however, belong to the lower class. The closer a person stands to whiteness, the greater his chances for political and economic success. Although factors other than color affect the social position of Afro-mixed bloods, evidence of the importance of color can be found in the widespread use over the centuries of such terms as "mulatto", "quadroon", "zambo", and "lobo", among others, which supposedly signify exact degrees of racial mixture. Confusion has arisen, however, because color identification has often varied from region to region and class to class.

Racial mixture has characterized almost every section of Latin America and the Caribbean. In some areas, a person's educational background, occupation, geographic location, wealth, or degree of political influence equally determine his class. In recent years, particularly in the Caribbean islands, a reversal of attitudes has emphasized blackness, not whiteness, as a mark of distinction, especially with the rise of nationalist aspirations.

Scholars disagree on whether or not cultural differences affect the movement of Negroes within these societies. Some say that Negroes attain social equality less easily in the British and Dutch regions than in Spanish and French-oriented areas. Others argue that elements of

white racism exist in all areas and that, irrespective of the European culture that is prevalent, Negroes lose opportunities because of color although they enjoy legal equality. Still others, however, suggest that Negro social equality depends not so much on physical appearance as on other factors, including the degree of racial mixture in the country. Scarce evidence and a lack of reliable studies lend support to each outlook.

Negro Culture. African culture has considerably influenced the behavior of Negroes, especially in areas of isolation from European culture or where Negroes have outnumbered other peoples. Thus African proverbs, dancing, foods, language, and family behavior have persisted around the Caribbean Sea and Brazil. In Brazil, the dance known as the samba, as well as many spices, are thought to be of African origin, as are calypso (q.v.), a form of music originating in Trinidad, and the provincial dances of Colombia.

In the British areas of the Caribbean Sea, most Negroes are Protestants, but most Latin American Negroes are Roman Catholics. Many of these people live by the rules of African-influenced cults that are not formally recognized. In Haiti the wide following of voodoo (q.v.) transcends class differences. Similarly, *Shango* (*Xango*), a blend of Protestant and African beliefs, is widely practiced in Jamaica together with *Nanigo* and *Santeria*, both blends of Roman Catholic and African beliefs, in Cuba. Pocomania, another similar combination of beliefs, is popular in Trinidad. Often formal and informal beliefs blend, explaining why followers of voodoo, for example, may call themselves Roman Catholics.

History. Negro culture in the Americas developed largely in the context of slavery. In the 16th-century slave traffic, Europeans transported West Africans of highly developed political and social culture to America largely because Amerindians died off from the demands of plantation and industrial labor. Under slavery Africans applied their talents to work their masters refused to perform. Indeed, the colonial economies of many areas relied on Africans, both slaves and freedmen. Although slave laws varied from place to place, slaves sought manumission (liberation from slavery) persistently with mixed success, and they frequently escaped or revolted. In Brazil, rebellious slaves formed hinterland communities, known as quilombas. The so-called Republic of Palmares, a group of Negro towns in the captaincy of Pernambuco, was one of the largest and most famous of these settle-

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ments: it existed from about 1650 to 1696. Explosive uprisings occurred in Mexico, Peru, and other Spanish colonies. Often slaves joined Indian uprisings, and sometimes they benefited from support by freedmen. At the turn of the 19th century, the spread of libertarian ideas resulted in increased slave revolts.

The founding of the first black republic in Haiti deepened the hopes for freedom among other men in Latin America and the Caribbean Sea. Afterward, Negroes joined the armies of the emerging Hispanic republics in the hope that their aims were truly democratic. In some areas, however, greater oppression of slaves accompanied political change. British and Dutch masters suppressed uprisings, and in Brazil the formation of an empire dampened hopes for the immediate abolition of slavery. Negroes fought successfully for citizenship in Colombia, Ecuador, Peru, and Venezuela. Social inequality continued to persist, however, largely because the class structure remained rigid in Hispanic America.

From the 1830's to the 1880's abolition movements developed throughout the region, usually with the support of Great Britain. After successfully ending the slave trade in their islands, the British urged its abolition in other areas, and later they supported the abolition of slavery in Cuba and Brazil. Free Negroes and persons of mixed blood meanwhile worked for abolition. Runaway slaves in the British possessions aided their still-enslaved brethren from rural hideaways and freedmen often helped in the cities. Similar movements arose in Colombia, Peru, and Venezuela before 1850, and in Puerto Rico, Santo Domingo, and Cuba after 1860. In Brazil, slavery persisted until 1888.

Abolition occurred in several stages. Owners initially freed "useless" elderly or youthful slaves. Others were later freed on condition that they continue to work for their masters with pay. Even after total abolition, difficult conditions persisted. Negroes learned soon that their former masters feared that as freemen they would refuse to work. Although the opposite proved true, the freed Negroes rarely received education and employment. Former owners preferred to encourage immigration to secure cheap labor in place of slaves. A remarkable rise occurred in immigration of Europeans, East Indians, and Asians, but Negroes, meanwhile, remained members of the disadvantaged lower class. Some moved to more promising areas, and others, for instance, in Cuba, rebelled to win political and economic opportunities.

After World War I, Negroes in Brazil formed

clubs from which developed a new black-awareness movement. Such movements concentrated on ending color discrimination against Negroes. In Jamaica, Negroes who returned from service in the British army formed trade unions. Several uprisings accompanied the newly awakened racial feeling. A black-power movement soon emerged in Brazil, where lack of jobs combined with frustration over insufficient funds to sustain the cultural movement, and a Brazilian Black Union called for black Brazilian nationalism. Organized with political and paramilitary branches, a youth program and cell-like organization at the local, state, and national levels, the activists successfully promoted black political and cultural needs. The movement ended, however, when Brazil turned to dictatorial rule after 1937.

Negroes in Latin America and the Caribbean faithfully served their countries in World War II, and they benefited generally from the wartime prosperity in these underdeveloped regions. Indeed, their expectations turned to bitterness when postwar inflation produced further economic and social dislocation. Postwar black nationalism merged into an independence drive in the Caribbean area that had succeeded in its aims by the mid-1960's. Black nationalists have since successfully opposed foreign domination of the Caribbean economy.

The nationalists were greatly influenced by Marcus Garvey (q.v.), a Jamaican who emigrated to the United States. Settled in Harlem (q.v.), a section of New York City, he incorporated in 1916 the Universal Negro Improvement Association. Although Garvey urged American Negroes to view Africa as their cultural homeland, generally he valued the solidarity of oppressed black men above purely nationalistic concerns. Through his newspaper, *The Negro World*, his ideas were introduced into the Caribbean, creating discussion throughout the region. After his death, Pan-Africanism became an important element in black nationalist thought, especially in Jamaica and Trinidad and Tobago.

Black pride has also reawakened in recent years in Brazil and Cuba. The degree of African heritage once more has arisen in discussions of Brazilian culture. Meanwhile, black pride and black awareness have blended with those aspects of the Cuban revolution that stress national pride and antiimperialism. Indeed, everywhere in Latin America and the Caribbean area, Negro citizens recently have demanded modernization of their lives and greater recognition of their cultural contributions.

See also NEGROES IN THE UNITED STATES, and the

history sections of the articles on the countries mentioned above. V.C.P.

NEGROES IN THE UNITED STATES. Negro population of the United States (see **NEGRO; RACES OF MANKIND**), comprising, according to the census of 1970, 22,672,570 persons, or 11 percent of the total population of the U.S., distributed throughout the fifty States and the District of Columbia. Owing principally to historical reasons associated with the former status of the Negroes as slaves, about 53 percent of Negro Americans live in the South Atlantic (6,423,710), East South Central (2,597,005), and West South Central (3,043,543) States. Approximately 17 percent (3,953,739) live in the Middle Atlantic States and about 17 percent (3,872,905) in the East North Central States. Comparatively few Negroes live in the Pacific (1,514,243), West North Central (698,645), New England (388,398), and Mountain (180,382) States. The concentration of Negroes in States formerly belonging to the Confederate States of America (q.v.) has declined from 81 percent in 1910 to 45 percent in 1970.

In no State do Negroes constitute a majority of the population. New York State, with 2,166,933 Negroes, has the largest black population of any State; Vermont, with 761, has the smallest. In 1970, sixteen cities with a population of 25,000 or over had at least as many Negroes as whites, and in five the proportion was over 60 percent: three cities in Los Angeles County, Calif., Willowbrook (82.3), Westmont (80.6), and Compton (71.0); Washington, D.C. (71.1); and East St. Louis, Ill. (69.1). In 1960, only three cities with a population of over 25,000 had a Negro population of at least 50 percent of the total: Washington, D.C.; Charleston, S.C.; and Bessemer, Ala. Of the entire Negro population, about one third live in the fifteen largest cities; the number residing in rural areas is diminishing steadily.

HISTORY

In general, the geographical, sociological, and economic status of Negroes in the U.S. has been significantly influenced by their position in the history of the nation. This history has been marked by an increasing awareness on the part of Negroes of their unique problems and by an increasing determination to obtain their full rights as citizens in a democratic society. Beginning in slavery (q.v.), Negroes have progressed through the development of leadership and national organizations, culminating in the civil-rights movement of the 1960's. Thus, the history of Negroes in the U.S. may be seen as a series of increasingly effective responses to the severe

hardships and challenges that they have encountered.

Slavery in the New World. The early history of the Negro in North America is generally associated with the development of slavery from the 17th century onward. Prior to that time, however, Negroes had participated in the exploration of the New World. Some historians believe that a Negro was a member of the crew of the Italian-born navigator Christopher Columbus (q.v.), and Negroes are known to have accompanied the Spanish explorers Vasco Núñez de Balboa and Francisco Vázquez de Coronado (qq.v.) on their expeditions to the Pacific Ocean and the Southwest, respectively. Many black men were soldiers and sailors in 16th-century Portugal and Spain, although even in these capacities some of them may have been slaves. The first Negroes to settle in North America, however, were brought to Jamestown, Virginia, in 1619, not as slaves but as indentured servants. Most of them came as laborers who were to be freed upon the expiration of their term of service. With these exceptions, however, slavery became entrenched in North America within the next few decades.

Slavery did not begin to develop as a rigid socioeconomic institution on the North American continent until the third quarter of the 18th century, when George III (q.v.), King of Great Britain, began encouraging the importation of slaves to the colonies. This circumstance led the American statesman Thomas Jefferson (q.v.), in the first draft of the Declaration of Independence (q.v.), to accuse the king of waging "cruel war against human nature itself, violating its most sacred rights of life and liberty in the persons of a distant people who never offended him, captivating and carrying them into slavery in another hemisphere . . .". In general, however, the sentiments expressed during the American Revolution (q.v.) were rarely concerned with the question of Negro slavery, although the first "rebel" to die under the guns of the British was a black man, Crispus Attucks (d. 1770); see **BOSTON MASSACRE**. At the beginning of the Revolutionary War not even free Negroes were permitted to join the Continental army. When hundreds of slaves were recruited by the British, who promised freedom to all who joined their forces, however, the Americans under General George Washington (q.v.) initiated the enlistment of free Negroes; within a matter of weeks he made to Northern slaves, with the consent of their masters, an offer similar to that of the British. Eventually 5000 Negroes fought on the American side. An equal number fought for the

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British: after the war they were transported to Great Britain, where they lived as free men.

In the U.S. the continued development of the institution of slavery after the Revolution is indicated by the increase in the number of slaves. It is further indicated by two provisions of the Constitution of the United States (q.v.). Article I declares that in the population of the States slaves should be counted as "three fifths of all other persons", thus allowing States with large slave populations to add them to their electoral total but denying them the vote. Another Constitutional provision extended the slave trade for twenty years. Between 1756 and 1790, the slave population grew from 200,000 to 700,000, and by 1830 it stood at 2,000,000. The increase was in part the result of technological advances and the coming of the industrial revolution (q.v.) in the late 18th century. The invention of the steam engine and the spinning jenny and especially the perfection of the cotton gin (q.v.) increased the capacities of textile plants in Great Britain and the northeastern U.S. This led to the growth of the plantation system for the production of cotton in the South, with a consequent increase in the number of slaves. As early as 1803, 20,000 slaves were being imported annually into South Carolina and Georgia alone.

The slave population was difficult to control. The so-called Black, or Slave, Codes, prohibiting assembly, education, or self-defense among Negroes, could not prevent the plotting of rebellions. The practice of sabotage was also widespread among slaves, some of whom murdered masters, poisoned wells, destroyed crops, maimed work animals, broke tools, and ran away. Although special "nigger tools" were devised, slaves found ways to break them. Running away was so common and so costly that it gave rise to an entirely new occupation, slave hunting. The Black Codes and the attitudes that complemented them were also applied to free Negroes in the South. In slave-holding territory free Blacks were not permitted to cross State lines or to move from county to county within a State. In most places free Negroes were required to have white patrons who stood surety for their good conduct. In no place in the South could free Negroes vote, or testify against a white person; in many places they could not buy or sell liquor, or work as clerks, typesetters, or printers. In the South after 1831 the education of Negroes was declared unlawful. The supreme court of South Carolina declared: "This race . . . in a state of freedom and in the midst of a civilized community, are a dead weight on the progress of improvement".

Free Negroes in the North. In the 1830's, half of the total of the 320,000 free Blacks in the U.S. lived in the North, where control was somewhat less rigid than in the South. Although they were required to have visible means of support, they had limited access to the labor market. They were not welcomed in industry, except as common laborers, and even this opportunity declined as large numbers of foreign immigrants entered the U.S. in the 1840's. In most States black men were disfranchised by various means. The prohibitive legislation in effect in Maryland, for example, was direct and unmistakable, as was that of Pennsylvania after 1838. In New York a property qualification of \$250 effectively prevented Negroes from voting. Finally, free Negroes in the North were in danger of being kidnapped, sent South, and enslaved, especially after the passage of the Fugitive Slave Law of 1850; see FUGITIVE SLAVE LAWS. North and South, free Negroes lived on the sufferance of Whites.

In both the North and the South, however, some free Negroes lived productive and even distinguished lives. Among them was the essayist and inventor Benjamin Banneker (1731-1806). Born in Maryland and largely self-taught, he produced an almanac that was praised by Jefferson, who later recommended Banneker as a member of the commission to lay out the city of Washington, D.C. Banneker became a well-known figure around the capital during the six months that he worked on this project. He continued to produce an almanac annually for a dozen years, and sending one to Jefferson, he alluded to himself as a member of a race "that has long labored under the abuse and censure of the world". Jefferson sent the almanac to the Academy of Science in Paris, and wrote his Negro correspondent that the almanac would certainly weaken the doubts that Whites felt concerning the intellectual powers of Negroes.

The entrepreneur Paul Cuffe (1759-1817), born in the sailing town of New Bedford, Mass., was also concerned for the status of his people. A shipwright who eventually owned a shipyard and sailed his own ships, Cuffe refused to pay taxes in his native Massachusetts until free Negroes were given the vote. In 1811 he went to Sierra Leone to look into the possibility of settling free American Negroes in Africa, and four years later he transported forty-eight Blacks there at his own expense. This venture was widely criticized by members of his own race, the great majority of whom disapproved of African colonization, which they saw as a plot to drain off the free black population while leaving slavery untouched. Among the critics of this ap-

proach was the newspaper publisher John Russ-worm (1799–1851), the first American Negro to graduate from college (Bowdoin in 1826). He spoke out against African colonization in the first Negro newspaper, *Freedom's Journal*, which he founded with the Rev. Samuel Cornish (1790–1859) in 1827. "Abide in the ship", Russ-worm warned, "or you cannot be saved". The New York Episcopalian priest Peter S. Williams (d. 1840) was more specific in his declaration: "We are natives of this country; we only ask that we be treated as well as foreigners. Not a few of our fathers suffered and bled to purchase its independence; we only ask to be treated as well as those who fought against it".

Although the British actress Fanny Kemble (see under KEMBLE) noted that free Negroes were treated like "pariahs" in American society, they were assisted by some Whites. Prominent white citizens in the North frequently participated in the conventions that free Negroes held annually after 1830. Predominantly white organizations such as the Society of Friends (see FRIENDS, SOCIETY OF) and the American Manumission Society supported Negro causes and gave added momentum to the abolition movement; see ABOLITIONISTS. Schools for Negroes, organized and staffed by Whites, were operating in New York, Philadelphia, and Boston as early as the 1780's. In the same period, free Negroes, even in the South, were encouraged to organize for self-help. A Baptist church was established by Negroes in Savannah, Ga., in 1779, and the first independent black religious denomination, the African Methodist Episcopal Church (q.v.), was founded by the minister and former slave Richard Allen (q.v.). Black churches and fraternal and benevolent associations subsequently proliferated throughout the country. The associations often served as insurance companies, which paid death benefits; banking establishments, which made small loans; and social and literary clubs, which, in the absence of schools, served as centers of basic instruction. Typical of these groups was the Brown Fellowship Society of Charleston, S.C., which not only held classes, but also helped to support free-born black orphans, one of whom, Daniel Alexander Payne (1811–1893), later became a bishop in the African Methodist Episcopal Church. The African Society in Boston, the Institute for Colored Youth in Philadelphia, and the Phoenix Society, with branches in several cities, did similar work. By the third decade of the 19th century such organizations in the North were producing many notable antislavery leaders and rhetoricians, including David Walker (1785–1830), Martin Rob-

inson Delany (1812–85), Henry Highland Garnett (1815–1882), and Frederick Douglass (q.v.). **The Antislavery Movement.** Another type of black leader developed in the South, where organizations of Negroes were viewed with misgivings and in some places were forbidden by law. Free Blacks as well as slaves were forced to conduct their meetings in an atmosphere of conspiracy that brought slave and freeman together in a way that was unnecessary in the North. While black leaders in the North were disposed to discussion and propaganda and to the use of political means, those in the South saw themselves as conspirators and activists. Many were slaves, and some were religious mystics, among them Gabriel Prosser (1775–1800), who organized the first large-scale slave conspiracy in Virginia in 1800. In 1822 Denmark Vesey (1767–1822), a free Negro, convinced hundreds of South Carolina Blacks, free and slave, that the uprising he planned had holy sanction, and he quoted the Bible to justify destroying "utterly all [Whites] that was in the city, both man and woman, young and old . . . with the edge of the sword". A rebellion, led by the slave revolutionist Nat Turner (q.v.), was postponed for nearly three years while Turner waited for a "sign from heaven". It came in August, 1831, and under its aegis Turner and his followers spread destruction, terror, and death among the slaveholders in Virginia.

Although Whites seldom participated in violent revolutionary activity, white abolitionists certainly condoned it, and their literature helped to create the climate in which it occurred. The abolitionist William Lloyd Garrison (q.v.), whose newspaper *The Liberator* was probably the most widely read antislavery journal, praised the violence of Turner's insurrection. Opposition to the abolitionist movement subsequently increased markedly throughout the South. In South Carolina, \$1500 was offered for the arrest of anyone caught distributing Garrison's paper. Abolitionists were accused of fomenting slave conspiracies. They helped to run the system known as the Underground Railroad (q.v.), by means of which 50,000 slaves, valued in excess of \$12,000,000, escaped from the South during the 1850's. In Maryland, \$40,000 was offered for the apprehension of one Underground Railroad "conductor", Harriet Tubman (q.v.), herself an escaped slave.

The dimensions of the antislavery struggle expanded and its intensity increased with the southwestward movement following the Missouri Compromise (q.v.) of 1850, but the struggle was not altogether sectional. Many North-

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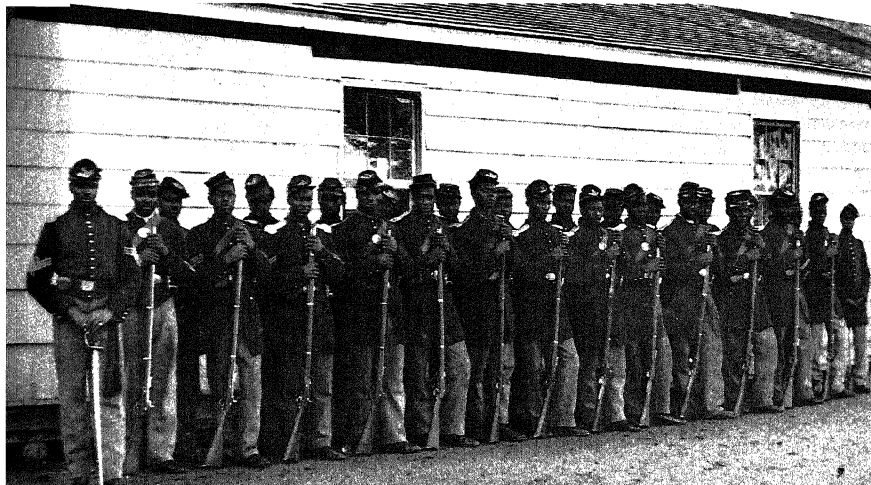
ern Whites, mostly of the working class, were proslavery, and a considerable number of Southern Whites, especially small farmers, were antislavery. Although the latter were mostly passive in the face of the will and power of slaveholders, Northern white workmen in Philadelphia, New York, Boston, Cincinnati, and other cities rioted against Negroes over housing and jobs, and organized strikes against the hiring of Negro labor. They disrupted abolitionist meetings, and in Alton, Ill., in 1837, a mob of proslavery Whites murdered Elijah Parish Lovejoy (q.v.), the antislavery editor of the *Alton Observer*.

Gradually, however, beginning in 1848 and continuing into 1850, the political polarization between North and South became increasingly clear. The provision of immediate direct consequence to the Negro was the new Fugitive Slave Law. Under its terms fugitives in the Northern States were no longer safe, and a suspected runaway could be arrested without a warrant; a sworn statement by the alleged owner was sufficient to condemn the suspect to perpetual slavery. Negroes lacking papers certifying their free status could not testify in their own behalf and could not demand a jury trial. Finally, the provision stipulated that anyone who gave even the slightest assistance to a runaway slave was liable to five years in prison or a fine of \$5000. The new Fugitive Slave Law, in short, threatened Negroes everywhere, but especially those in the North. Many fled to Canada, as their great leader Douglass, then publishing his paper in Rochester, N.Y., urged them to do. Bishop Payne despaired: "We are whipped, we are whipped! And we might as well retreat in order".

Few Negro leaders and abolitionists were as despairing as Payne. Indeed, the Fugitive Slave Law of 1850 simply incited the North to further defiance of the South. The strain on intersectional relations was further increased with the publication of the novel *Uncle Tom's Cabin* (1852) by the author and abolitionist Harriet Elizabeth Beecher Stowe (q.v.), and the strain became almost unbearable with the passage of the Kansas-Nebraska Act (q.v.) in 1854. This act stipulated that the question of slavery should be decided by the legislatures of the territories involved. Abolitionists and proslavery sympathizers sent men and arms into Kansas, where combat between them flared sporadically in events that some historians describe as marking the beginning of the American Civil War; see CIVIL WAR, THE AMERICAN.

Two other events brought the conflict closer. The first was the decision of the Supreme Court of the United States (q.v.) in the Dred Scott Case (q.v.) in 1857. The Court ruled against a slave who sued for his freedom on the grounds that his residence in free Illinois territory, where his master had taken him, entitled him to be released from bondage. In announcing the view of the Court, Chief Justice Roger Brooke Taney (q.v.) noted further that black men in the South, whether slave or free, possessed no rights that white men were bound to respect. The Court thus gave judicial sanction to the repressive practices in the South, causing despair among many Negroes and their supporters in the North. The other event that figured prominently in the pre-Civil War period involved the militant abolitionist John Brown (q.v.). His raid on the U.S. arsenal at Harpers Ferry, now in West Virginia, on Oct. 16, 1859, was an attempt to incite

Company E, 4th U.S. Colored Infantry during the Civil War.
Bettmann Archive



The first Negro Senator and Congressmen who served during the period of Reconstruction after the Civil War in America. (Standing, left to right) Robert C. De Large and Jefferson H. Long. (Seated, left to right) Senator H. R. Revels of Mississippi, Benjamin S. Turner, Josiah T. Walls, Joseph H. Rainey, and R. Brown Elliot.

Bettmann Archive



rebellion among the slaves in the South, who, he believed, would rally to the cause.

When the war came, black men in the North were at first not allowed to enlist in the army, and Douglass was refused permission to recruit a Negro regiment. Although Negroes thought of the war as a struggle for freedom, President Abraham Lincoln (q.v.) considered that its primary purpose was to preserve the Union of the States and not to free the slaves. From the beginning, however, the Confederate States used slaves in support of Southern forces. Slaves built roads and breastworks, served as wagoners and hostlers, and worked in agriculture and industry. One Southern editor declared that "slavery in the South alone enables her to place in the field a force much larger in proportion to her white population than the North . . . The institution . . . is really one of the most effective weapons employed against the Union by the South".

Faced with this reality, influential Northerners, including Garrison, the journalist Horace Greeley, and Senator Charles Sumner (qq.v.) of Massachusetts, urged the President to enlist Blacks, and in the fall of 1862, after the Union had suffered a series of defeats, the President consented. On Jan. 1, 1863, to provide further moral justification for the war, he issued the Emancipation Proclamation (q.v.), calling for the liberation of the slaves. Eventually 200,000 Negroes fought on the Union side in the war, and 40,000 died. In the last year of the conflict Confederate legislation called for the military recruitment of 300,000 black slaves and freemen, but there are no records of Negroes having taken up arms in defense of the Confederacy.

Reconstruction. After the war the program of Reconstruction (q.v.) originally proposed by Lincoln was carried through by the so-called radical Republicans (see REPUBLICAN PARTY), largely over the opposition of President Andrew Johnson (q.v.). All qualifications that had worked against the civil equality of Negroes were eliminated through the Thirteenth, Fourteenth, and Fifteenth Amendments to the Federal Constitution; and troops were sent to the South to ensure that the new constitutional provisions were enforced. Blacks, including some former slaves, were elected to local offices and State legislatures. Negroes served as secretaries of state, lieutenant governors, and superintendents of education; as sheriffs, justices of the peace, and county committeemen in most of the former Confederate States. Between 1869 and 1901, twenty-two Negroes were elected to the Congress of the United States; two, from Mississippi, Hiram R. Revels (1822-1901) and Blanche K. Bruce (1841-97), served in the Senate.

Southern Whites reacted bitterly to these advances. Temporarily without political power because of the activities of such Republican-oriented agencies as the Freedmen's Bureau (q.v.), the Union League, and the so-called carpetbaggers (q.v.), they organized a number of secret societies, including the Ku Klux Klan (q.v.), the Knights of the White Camelia, and the Regulators, which bribed, terrorized, and murdered to keep Negroes from exercising their constitutional rights. During the administration of President Rutherford Birchard Hayes (q.v.), Federal troops were withdrawn from the South,

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leading to a new disfranchisement of Blacks in the region. By 1900, the status of the Negro in the South was almost as it had been in slavery.

The position of Negroes in the North was better. They could vote, although few did; they could seek public office and attend public schools in most of the cities. Despite such advantages, they were not organized to fight for the welfare of their race. The more ambitious among them were oriented toward middle-class values and to the Protestant ethic of work. They pointed with pride to Elijah McCoy (1844-1928), who invented a lubricating device for railroad cars, called a journal box; to Jan Ernst Matzeliger (1852-89), who perfected the shoelasting machine; to Granville T. Woods (1856-1910), inventor of the railway communications system; to Daniel Hale Williams (1858-1931), heart surgeon; and to the educator and botanist George Washington Carver (q.v.). Most Northern Negroes, however, lived strictly segregated social lives on their side of the "color line" in the poorer sections of cities. They had their own churches, fraternal lodges, and clubs, their own small businesses, and the professional services of a few doctors, dentists, and lawyers of their own race. Although they suffered civic and economic disabilities collectively, Negroes in the North tended to ignore them. Negroes in the South, however, attempted to overcome their oppressive conditions by forming an alliance with white farmers in a phase of the political movement known as populism (q.v.). The subsequent failure of this movement in 1896 led to an intensification of racial oppression in which white Southern politicians, often supported by Northern industrialists with economic interests in the region, openly played on racial antagonisms. They supported myths of Negro inferiority and raised the specter of possible Negro rule if such measures as lynching and segregationist "Jim Crow" laws were not accepted. In this way they discouraged white opposition to the established economic system by offering apparent protection against the alleged threat of Negro domination. By 1900, Negroes in the South were segregated in every area of life.

New Leaders. With the overthrow of Reconstruction in the South and with the subsequent growth of Negro migration to the North, many Blacks began to recognize that a race problem existed and that all Negroes were involved in it. One of the most prominent spokesmen of this new attitude was the educator Booker Taliaferro Washington (q.v.), who had been born a slave in Virginia in the 1850's. He was profoundly in-

fluenced during his education at Hampton Institute (q.v.) by the teachings of its white principal, Samuel Chapman Armstrong (q.v.), who believed that Negroes and Indians were inferior to white men, and that they should be trained in such vocational skills as Whites would find useful, contenting themselves with second-class citizenship. The race policy and the educational program proposed by Armstrong were accepted by Whites, some cynically and some because they sincerely believed that it was best for both races. When Washington, as principal of Tuskegee Institute (q.v.), projected this policy and program in a speech that brought him to national attention in 1895, some of the most influential white men in America chose him as the only spokesman for the Negro, a position that he maintained until his death in 1915.

Opposition to Washington, however, had begun to form at least a decade before his death, largely through the efforts of the sociologist and educator W(illiam) E(dward) B(urg-hardt) Du Bois (q.v.), who, in 1905, issued "a call to a few selected persons for organized determination and aggressive action on the part of men who believe in Negro freedom and growth". His call led to the organization of the so-called Niagara Movement on the basis of principles that included "full manhood suffrage", "an end to discrimination and segregation" in education and places of public accommodation, and the "right to work". The principles and concepts of this short-lived and loosely organized movement were absorbed by the newly formed National Association for the Advancement of Colored People (q.v.), known as the N.A.A.C.P., which Du Bois helped found in 1910, declaring: "We claim for ourselves every single right that belongs to a freeborn American, political, civil, and social; and until we get these rights we will never cease to protest and assail the ears of America".

The N.A.A.C.P. brought new energy and a new approach to the solution of the race problem. Its biracial membership, which included such white Americans as the social worker Jane Addams, the novelist and critic William Dean Howells, and the philosopher John Dewey (qq.v.), opened channels of communication previously closed, launching a political crusade against lynching (q.v.) and mob rule, and forming a lobby in Washington. Its Legal Redress Committee, which included Moorfield Storey (1845-1929) and Joel Elias Spingarn (1875-1939), brought legal suits to establish and protect the voting rights of Negroes, to eliminate residential segregation, and to secure justice in the courts.

The N.A.A.C.P. also published a magazine, *The Crisis*, edited by Du Bois, which set forth the often disturbing facts about Negro life in the U.S. and demanded changes in prevailing conditions. The circulation of *The Crisis* grew from 1000 in 1910 to 100,000 in eight years.

Editorial attitudes similar to those of *The Crisis* were expressed by Negro weekly newspapers on sectional and local levels. Monroe Trotter (1872-1934), a friend of Du Bois and a vigorous opponent of racial discrimination, published the *Boston Guardian*, which circulated throughout New England. From Baltimore the *Afro-American* was distributed in the Middle Atlantic States, and in Chicago the *Defender*, published by Robert S. Abbott (1870-1940), counseled more than 30,000 black readers a week that the U.S. was not a land of opportunity for them so long as they were excluded from trade unions and lacked equal protection of the laws and representation in local, State, and national legislative bodies. Such Negro newspapers and magazines helped to counteract the negligent, derogatory, and stereotyped attitudes toward Negroes that often prevailed in the white American press. In 1906, for instance, only one paper with national coverage, *The New York Times*, took note of the death of the poet Paul Laurence Dunbar (q.v.), who had been one of the most popular U.S. writers for nearly a decade. The daily press made the boxer Jack Johnson (q.v.) seem a brutish degenerate when he won the world heavyweight boxing championship from a white man. Condescending, facetious items about popular black entertainers in the minstrel tradition were common. Negroes had to turn to their own press to learn that the painting "Resurrection of Lazarus", which the French government purchased for its permanent collection in 1896, was the work of the black American painter Henry Ossawa Tanner (1859-1937), and that Maude Cuney Hare (1874-1936), who sang at the world-famous opera house, La Scala, in Milan, Italy, was black.

The Negro in World War I. During World War I, with the recall of foreign nationals to the countries of their birth and with the general expansion of the economy, many new jobs became available to Negroes, principally in the war industries of the North. The continuing growth in Negro migration (q.v.) to the Northern cities, however, produced problems that such groups as the biracial National Urban League (q.v.), which had been organized in 1911, still lacked the sophistication to meet. Poor housing and inadequate sanitation often characterized neighborhoods in which a major-

ity of the residents were black, and hospitals, schools, and other tax-supported facilities were often lacking in such areas. Efforts to move into better neighborhoods met bitter resistance, leading to periodic race riots in the North throughout the war; in the period from 1911 to 1917, 365 Negroes were lynched, most of them in the South.

When the U.S. entered World War I in 1917, Negroes seemed eager to serve in the military. They were hopeful that the conflict was in fact a "war to make the world safe for democracy", as President Woodrow Wilson (q.v.) had indicated, and the statement had a special meaning for them. Within five days of the declaration of war, Negroes had volunteered in such numbers that the quotas of the four all-Negro units of the United States Army were filled. When the military draft went into effect shortly afterward, about 365,000 Negroes were inducted, although they subsequently encountered much discrimination in the armed forces. Colonel Charles Young (1864-1922), a graduate of the U.S. Military Academy, and the only black officer of field rank in the army, was abruptly retired on the grounds of ill health, an action that Negroes considered a ruse to avoid promoting Young. Their protests eventually led to the establishment of an officers training camp for Negroes; fewer than a thousand received training there, however, and none attained a rank higher than major. The policy of segregation maintained by the U.S. War Department, and by the Federal government in all its branches, was accompanied during the war by the appointment of a Negro writer, Emmett Jay Scott (1873-1957), to serve as "advisor in matters affecting the interests of the ten million negroes of the U.S. and the part they are to play in connection with the present war". Although the appointment was generally praised, Scott had no influence over official policy, and racial friction continued in training camps and in nearby cities. Negroes were kept in service units, and were usually assigned such duties as the unloading of ships, the construction of military installations, and the handling of supplies. They also served as orderlies and sanitary engineers. A few Negro units, some brigaded with French troops, and including the 92nd, 93rd, and 369th Infantry Divisions, especially distinguished themselves in combat, and news of their exploits improved Negro morale. The first Americans to receive the highest decoration of the French government, the Croix de Guerre, were Blacks.

Negroes at home also supported the war effort. Denied membership in most labor unions,



Shortly before the opening of the 1948 Democratic National Convention in Philadelphia, pickets led by A. Philip Randolph, then president of the Brotherhood of Sleeping Car Porters, appeared outside Convention Hall demanding equal rights for Negroes in the party platform. UPI

however, they were discriminated against in wages and working conditions and frequently held the most hazardous and menial jobs in munitions plants, shipyards, and the transportation industry. Nevertheless they purchased Liberty Loan Bonds and Thrift Stamps and contributed to the United War Camp Fund in amounts exceeding \$250,000,000, and they shared the belief that the war gave them an opportunity to prove that they were loyal Americans, who would enjoy the rights of full citizenship at the conclusion of the war.

The Harlem Renaissance. After the war, conditions worsened for the Negro. Racial hatred became more deeply entrenched and more solidly organized than ever before. The Ku Klux Klan, which was, at the same time, anti-Catholic and anti-Jewish as well as anti-Negro, extended its activities to the Mid-Atlantic, New England, and Midwestern States. In employment and housing, Negroes continued to be subject to discrimination.

These conditions began increasingly to be opposed by Negroes, even though their opposition was often falsely alleged by the U.S. Department of Justice and other authorities to be linked with many of the most radical organizations of the time. Several spokesmen, including the labor leader and editor of the magazine *The*

Messenger, A(sa) Philip Randolph (q.v.), were concerned with social equality for Negroes and with their right to self-defense in such situations as race rioting, which, they felt, white mobs had provoked in eight cities in the summer of 1919. Many Negroes found opportunity for self-expression in the theater, jazz (q.v.), and literature; see *NEGRO LITERATURE, AMERICAN*. Black scholars produced many studies in the social sciences, and the N.A.A.C.P. and the National Urban League expanded their programs and devised new strategies to implement them. New organizations, such as the Universal Negro Improvement Association, the National Equal Rights League, and the Southern-based Commission on Interracial Cooperation, were formed and chapters were established in states throughout the U.S.; see *NEGRO ORGANIZATIONS*.

New black leaders and spokesmen emerged in the postwar years. The editor and author James Weldon Johnson (q.v.) temporarily abandoned a literary career to become secretary of the N.A.A.C.P., and in 1921 he worked for the passage of a Federal antilynching law, which was defeated by Southern opposition in Congress. Walter Francis White (q.v.) also joined the staff of the N.A.A.C.P. and began the investigative work that culminated in the publication of his book *Rope and Faggot* in 1929. The sociologist Charles Spurgeon Johnson (1893-1956) became editor of *Opportunity*, the journal of the National Urban League, and promoted "go to high school—go to college" campaigns as well as the cultural rebirth that came to be called the

Harlem Renaissance. Negro leaders in the sciences at this time included the research chemist Percy Julian (1899–), who worked with steroids, and the engineer Garrett A. Morgan (1875–1963), inventor of the three-way traffic signal. One of the most controversial of the new black leaders was the Jamaican-born Marcus Garvey (q.v.), who believed that white racism in the U.S. was so pervasive as to make it impossible for white men ever to deal with Blacks on the basis of human equality and justice. Through his Universal Negro Improvement Association, he attempted to encourage American Negroes to migrate to Africa, where, he believed, they would establish their own government. Garvey's movement was generally rejected by Negro intellectuals.

By 1925 the Harlem Renaissance was at its peak. Not confined to Harlem (q.v.), it represented a composite of Negro sociocultural interests. The Negro mind and personality, Negro life, and various aspects of the "Negro problem" became the focal points of attention for some outstanding scholars and talent, black and white. The sociologist Robert Ezra Park (1864–1944), impressed by the continuing work of E. Franklin Frazier (1894–1962), advanced his studies of the Negro community. Spurred by Du Bois' earlier scholarship, Howard Washington Odum (1884–1954) and Guy Benton Johnson (1901–) at the University of North Carolina established their academic reputations in the social dynamics of race relations. Negro subjects became increasingly important in the works of white authors, including the dramatists Eugene O'Neill and Paul Eliot Green and the novelists Carl Van Vechten and DuBose Heyward (qq.v.). Essentially, however, the Harlem Renaissance was generated by black people for their own cultural and spiritual liberation, notably in the blues (q.v.) of the composer W(illiam) C(hristopher) Handy, and the jazz of the musicians Duke Ellington and Louis Armstrong (qq.v.). Notable singers included Marian Anderson, Roland Hayes, and Paul Robeson (qq.v.). A unique Negro idiom was employed by black writers of the period, notably (James) Langston Hughes and Countee Cullen (qq.v.).

The Negro and the New Deal. As the economic depression of the 1930's grew in intensity, Negroes began to liberate themselves from their adherence to the Republican Party, which they had supported since Reconstruction. During the 1920's the Democratic Party (q.v.), with its increasing support for social reforms and its opposition to the Ku Klux Klan, began to win the support of Negroes. In 1930 Democratic

leaders joined Negroes in opposing the confirmation of Judge John Johnston Parker (1885–1958) as an associate justice of the U.S. Supreme Court. Parker, generally regarded as an opponent of the interests of Negroes, was not confirmed. Illinois Democrats waged a strong campaign for the election of the Negro lawyer Arthur Mitchell (1883–1968) to the U.S. House of Representatives in 1934, and with the organized support of the party, black Democrats were elected to the State legislatures in Maryland, West Virginia, Pennsylvania, and New York. These political gains impressed increasing numbers of Negroes and offset the blandishments of the Communist Party, which ran a Negro as its Vice-Presidential candidate in 1932, 1936, and 1940. By 1937 the majority of Negro voters had become registered Democrats.

During the administration of President Franklin Delano Roosevelt (q.v.) and through his legislative program known as the New Deal (q.v.) several outstanding Negroes held posts in the newly established Federal relief agencies. Among them was economist Robert Clifton Weaver, who, during the administration of President Lyndon Baines Johnson (qq.v.), became secretary of the Department of Housing and Urban Development and was the first Negro appointed to a position in the cabinet. William Henry Hastie (1904–), later the first black judge in the Federal court system, Ralph Johnson Bunche (q.v.), later deputy secretary-general of the United Nations, and other "race relations" officers were instrumental in such efforts as bringing 250,000 Negro youths into the Civilian Conservation Corps (q.v.) and in obtaining government loans for more than 50,000 Negro farmers. The National Youth Administration enabled nearly 50,000 black boys and girls to continue their education in high school and beyond, and the Work Projects Administration (q.v.) employed black artists and writers, some of whom subsequently became well known throughout the world.

Most Negroes, however, were relatively unaffected by these efforts, and more than 2,000,000 Blacks living in urban communities required direct relief in food, clothing, fuel, and shelter. Thousands of Negroes in rural areas in the South, suffering from the prejudice and discrimination of local officials, participated in the organization of the biracial Southern Tenant Farmers Union in 1935. In the same year the newly formed Committee for Industrial Organization, later the Congress of Industrial Organizations (q.v.), wrote into its charter a prohibition against discrimination on the basis of race.



Ignoring harassment by angry whites, Elizabeth Eckford walks through the lines of National Guardsmen in an effort to gain entrance to Central High School in Little Rock, Ark., in 1957. UPI

Subsequent Federal legislation attempted to equalize the wages of Blacks and Whites in some occupations.

A growing awareness among Negroes of the social and legal, as well as economic, discrimination to which they were subject was heightened by such events as the controversial trial of nine Negroes in Scottsboro, Ala., in 1931; see SCOTTSBORO CASE. Such international events as the invasion of Ethiopia by the Italian dictator Benito Mussolini (q.v.) and the disdain publicly expressed by the German dictator Adolf Hitler (q.v.) for the Negro champion Jesse Owens (q.v.) at the Olympic Games in Berlin in 1936 were countered in the minds of many Negroes when the boxer Joe Louis (q.v.) defeated the German prizefighter Max Schmeling (1905–) for the heavyweight championship of the world in 1938. Also in that year the U.S. Supreme Court, in *Gaines vs. the University of Missouri*, ruled that State universities must admit Negroes for studies otherwise unavailable to them. The National Negro Congress, a group of political, religious, and social organizations formed in 1936, began to coordinate policies and programs for the betterment of Negroes. A notable protest against the failure of the Federal government to ensure equal employment for Negroes occurred in 1941, when such leaders as Randolph and White organized a march on Wash-

ington to decry government inaction. Largely as a result of this effort, President Roosevelt issued an executive order prohibiting discrimination in the employment of workers in defense industries and in government. The order also established a national Committee on Fair Employment Practice, known as F.E.P.C., to see that the order was carried out; see FAIR EMPLOYMENT PRACTICE, COMMITTEE ON.

One almost immediate consequence of the order was an expansion of Negro migration into industrial centers, particularly in the East and West, to which poor Southern whites were also attracted by growing employment opportunities, leading to a notable increase in the urban population. A thousand migrants of both races entered Los Angeles every day at that time. Some 250,000 Negroes settled in metropolitan San Francisco in less than five years. Denver, Portland, and Seattle were quickly crowded beyond the capacity of local governments to deal with the new developments. Rioting broke out between Whites and Negroes, and between Whites and Mexican Americans, in Los Angeles in 1942; and in 1943 President Roosevelt ordered troops into Detroit to quell a severe riot. Smaller disturbances occurred in other cities.

These disruptions were in some measure a reflection of the rising expectations of the Negro people. The status of Negroes in the armed forces, for example, was appreciably higher than it had ever been before, although segregation in the armed forces continued throughout World War II. Blacks were receiving training as fighter pilots as early as 1940. Formerly confined to messmen ratings in the Navy, and altogether excluded from the Marines, in 1942 Negroes were assigned to all naval ratings and were enlisted in the Marine Corps. Officer's training was placed on an integrated basis in most branches, and several hundred Negroes attained ranks of major and colonel. In 1940 Benjamin Oliver Davis (1877–1970) became the first Negro general in the United States Army. Roughly 1,000,000 black men and women served in every theater of war and in all military establishments during World War II. Near the end of the war, Blacks and Whites were integrated on the platoon level in the fighting in Germany. Although President Harry S. Truman (q.v.) issued an executive order terminating segregation in the armed forces in 1948, the order was not fully implemented until the Korean War (q.v.) began in 1950.

The Civil-Rights Movement. The war against National Socialism and fascism (qq.v.) had put the U.S. race problem in a worldwide context.

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The Charter of the United Nations (q.v.), moreover, with its reaffirmation of human rights and fundamental freedoms, coincided with many of the demands of the black community, and Negroes were gratified when several of their leaders were accredited by the State Department to attend the organizational meeting of the U.N. in San Francisco in 1945. In 1946, acting on behalf of its constituent civil-rights groups, the National Negro Congress addressed to the Social and Economic Council of the U.N. an "Appeal to the World, a Statement on the Denial of Human Rights to Minorities in the Case of Citizens of Negro Descent in the United States and an Appeal to the United Nations for Redress".

Some Americans, among them the U.S. attorney general, were dismayed that American citizens felt compelled to "go over the heads of their government in seeking redress of grievances". Negro leaders noted, however, that the appeal was meant to alert the Federal government to the need for improving the racial climate if it wished to have the support of the new African nations in the ideological struggle against Communism, and if it wished to maintain its leadership among the nations of the world.

Shortly after the presentation of the appeal, President Truman appointed a biracial Committee on Civil Rights, and the following year the committee recommended termination of segregation "in all areas of American life" and the establishment of a permanent fair employment practices commission. The recommendations, which the President approved, were opposed by some influential Southern Democrats in Con-

gress who also refused to support him in the Presidential election of 1948. Truman, pledging to continue his support for civil rights for Negroes, was elected, however, despite the opposition of many Southerners. President Truman appointed several Negroes to high government posts, notably Hastie as governor of the Virgin Islands in 1946 and as a judge of the 3rd U.S. circuit court of appeals in 1949, and an official of the Congress of Industrial Organizations, George Leon Paul Weaver (1912-), who later became an assistant secretary of labor.

In the early 1950's, the legal staff of the N.A.A.C.P., headed by the lawyer Thurgood Marshall (q.v.), who became an associate justice of the Supreme Court in 1967, determined to challenge the legality of the "separate but equal" doctrine, which had been used as the legal basis for racial segregation in the public schools of many States, particularly those in the South, since the *Plessy vs. Ferguson* decision of 1896. In 1952 the cases in five States were combined and presented to the Supreme Court. When the Court ruled, in the case of *Brown vs. Board of Education* (1954), that "separate educational facilities are inherently unequal" and subsequently indicated that public schools must be desegregated "with all deliberate speed", Negroes felt that they had won a substantial victory. Many school boards in the South, however, defied the decision, and the States of Alabama, Georgia, Mississippi, and Virginia threatened to abolish public schools rather than permit the mixing of the races in them. Other States devised administrative and "legal" stratagems to avoid compliance, including the establishment of hastily organized "private" schools for the

President Lyndon Baines Johnson talks with civil-rights leaders of the early 1960's in his White House office. (Left to right) Roy Wilkins, James Farmer, Dr. Martin Luther King, Jr., and Whitney Young.
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NEGROES IN THE UNITED STATES

education of white students. Such measures were generally opposed by the Federal government, and in 1957 President Dwight David Eisenhower (q.v.) used Federal troops to enforce the desegregation of Central High School in Little Rock, Ark. Similar actions were taken during the administration of President John Fitzgerald Kennedy (q.v.) to bring about desegregation at the University of Alabama and other institutions of higher learning.

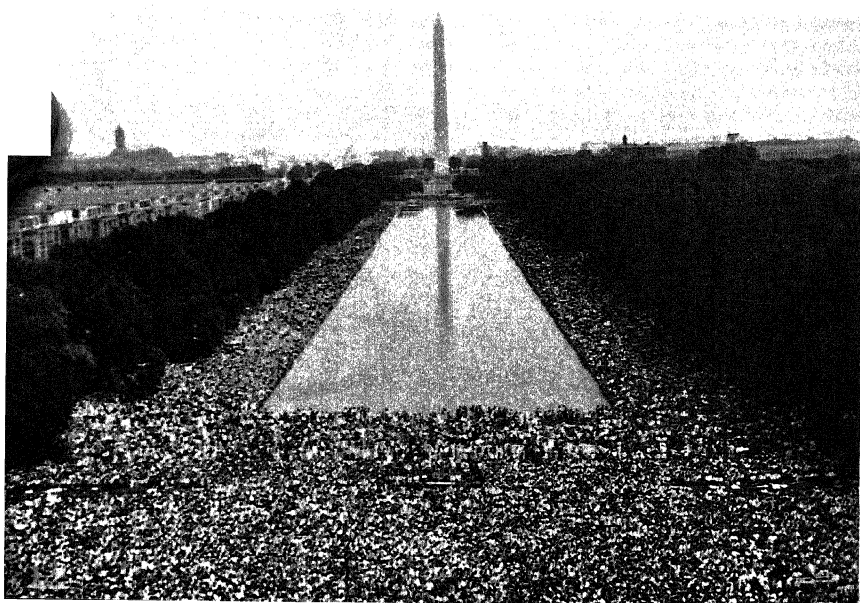
These actions, which were often opposed with violence and intimidation on the part of many white Southerners, were accompanied by many new activities among Negroes themselves, particularly those initiated by the Reverend Martin Luther King, Jr. (q.v.). In 1956 King led a highly effective boycott of the city bus system in Montgomery, Ala., to protest the segregation of public transportation in that city. Gaining widespread recognition after his success in this action, King was joined by many supporters in obtaining desegregation of public facilities in the South, notably in two Alabama cities, Birmingham and Selma. The extreme violence with which King's efforts were opposed, especially by the police in these cities, and his own policy of nonviolent "civil disobedience", derived in some respects from the principles of the Indian nationalist leader Mohandas Karamchand Gandhi (q.v.), won him the support of many Whites

in the North. During the early 1960's many of these supporters joined with Negroes to form the groups known as "Freedom Riders", who traveled extensively throughout the South in generally successful efforts to end segregation in facilities dependent on interstate commerce. Other techniques of protest developed during this period included the "sit-in", designed to promote the desegregation of such facilities as lunch counters, and voluntary submission to arrest on the part of large groups of civil-rights advocates.

These activities reached a climax on Aug. 23, 1963, when such organizations as King's Southern Christian Leadership Conference, the N.A.A.C.P. under Roy Wilkins, the National Urban League under Whitney M(oore) Young, Jr. (qq.v.), and the Congress of Racial Equality under James Farmer (1920-), together with many white supporters, organized an impressive meeting in the national capital. Described as a "march on Washington for jobs and freedom", the gathering of more than 200,000 persons concluded with a notable speech by King at the Lincoln Memorial, in which he observed that "the whirlwinds of revolt will continue to shake the foundations of our nation until the bright day of justice emerges . . . I have a dream that one day this nation will rise up and live out the meaning of its creed". Largely as a result of this activity, President Kennedy urged the adoption of strong legislation to prohibit discrimination in all government agencies and to enforce the desegrega-

Crowds, which police estimated at over 200,000, poured into Washington for the civil rights march in 1963.

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tion of public schools and other facilities. Much of Kennedy's civil-rights legislation was enacted during the administration of President Johnson, who also urged the passage in 1965 of the so-called Voting Rights Act, which provided guarantees for the rights of Negroes to register and vote, especially in the South, where such rights had previously been severely restricted both by law and by such extralegal means as violence and intimidation. See *ELECTORAL REFORM: Electoral Reform in the United States*.

Through their increasing participation in the electoral process, Negroes gained several important spokesmen in legislative bodies and municipal government. In 1966 Edward William Brooke (q.v.) of Massachusetts was elected to the U.S. Senate, the first Negro to serve in that body since Reconstruction, and in 1968 Shirley Chisholm (1924-), the first black woman ever to serve in Congress, was elected a member of the U.S. House of Representatives from New York. Many Negroes were elected to State legislatures, among them Julian Bond (1940-), the first Negro to serve in the Georgia State legislature in the 20th century and an active participant in the development of reforms to assure proper representation of Blacks in primaries and nominating conventions. Blacks selected as mayors of major cities included lawyer Carl Burton Stokes (1927-), of Cleveland, Ohio; lawyer Richard Hatcher (1933-), of Gary, Ind.; and engineer Kenneth Gibson (1932-), of Newark, N.J. In the South, businessman (James) Charles Evers (1922-), brother of the assassinated civil-rights worker Medgar Evers (1925-63), was elected mayor of Fayette, Miss. Several Negro movements also sought representation through such groups as the Black Muslims (q.v.) and their leader Malcolm X (q.v.), and through such spokesmen as the civil-rights leader Stokeley Carmichael (1941-), and the leaders of the Black Panther Party (q.v.).

Political action continued to be an important tool of Negro leaders in the early 1970's. In March, 1972, a National Black Political Convention was held in Gary, Ind., and resolved to establish a National Black Assembly to promote the political interests of Negroes. In the national elections in 1972, three Blacks, all members of the Democratic Party, were newly elected to the House of Representatives: Barbara C. Jordan (1936-) of Texas, the Rev. Andrew J. Young, Jr. (1932-) of Georgia, and Yvonne Brathwaite Burke (1932-) of California.

The continuing grievances of black people, particularly in such matters as housing, employment, and strained relationships with the police,

became especially apparent during a series of riots that occurred in Los Angeles, Calif., in 1965 and in Newark, N.J., and Detroit, Mich., in 1967. Severe riots also occurred in Washington, D.C., and other cities in 1968, following the assassination of Dr. King. The commission, appointed by President Johnson to investigate the cause of these riots, was known as the Kerner Commission after its chairman, Otto Kerner (1908-76), former governor of Illinois. In its report, the commission warned of the dangers of growing racial polarization in the U.S. By 1970, however, many Negro spokesmen indicated increasing concern over the continued problems of discrimination in housing and employment and the incomplete desegregation of public schools and other facilities. Many Blacks, moreover, saw an increasing need for developing their own political and economic influence and for establishing control of their own communities. In addition, they noted the extent to which their interests were linked with those of the peoples of Africa, Latin America, and Asia, and with those of other minority groups in the U.S. Black people took pride, however, in the cultural achievements of such figures as operatic soprano Leontyne Price (q.v.), orchestra conductors Dean Dixon (1915-) and Henry Lewis (1932-), ballet dancer and teacher Arthur Mitchell (1934-), educator and psychologist Kenneth Bancroft Clark (1914-), and lawyer and educator Patricia Roberts Harris (1924-). Outstanding sports figures include tennis player and golfer Althea Gibson, tennis player Arthur Robert Ashe, Jr., and baseball player Jackie Robinson (qq.v.). Bill Russell (1934-) and Frank Robinson (1935-) became the first black coach and manager in professional basketball and baseball, respectively.

See also CIVIL RIGHTS AND CIVIL LIBERTIES; DISCRIMINATION.

NEGRO LITERATURE, AMERICAN, novels, poems, short stories, plays, essays, and other writings by black Americans; see *NEGROES IN THE UNITED STATES*. Most black American writers have been torn between a strong identification with the black American experience and a compelling need to belong to the currents that have shaped the growth of the United States. Thus, one of the principal tasks of black writers throughout the 18th, 19th, and 20th centuries has been to render in narrative, poetic, or dramatic terms their identities as persons of African descent in a nation that long relegated them to second-class status and whose traditions and ethos are based on a European heritage that is alien to them. As a consequence of this essential

NEGRO LITERATURE, AMERICAN

dichotomy, the two predominant themes of all black literature have been, and continue to be, the search for identity and the quest for freedom. Literature has also developed from the vast oral traditions of Afro-Americans.

18th and 19th Centuries. The earliest known work by a black American writer is "Bar's Fight, August 28, 1746", a 28-line poem of doggerel by Lucy Terry (1730-1821). Shortly afterward came the poem "An Evening Thought; Salvation by Christ, with Penitential Cries" (1760) by a slave, Jupiter Hammon (1720?-1800). African-born poet Phillis Wheatley (q.v.), the servant of a tailor's wife in Boston before her release from slavery, was the first black American to receive considerable critical acclaim as a writer. Her collection *Poems on Various Subjects: Religious and Moral* (1773, London) is predominantly religious in tone. *The Interesting Narrative of the Life of Gustavus Vassa, the African* (1789, London), regarded as the fullest and most penetrating account of an 18th-century black man's life, was the first published autobiography by a Negro American. It is attributed to Olaudah Equiano (1745?-1801?), a slave who bought his freedom, settled in England, and afterward became active in the antislavery movement.

During the early and mid-19th century, with the intensification of the slavery (q.v.) issue in the U.S., most of the writing produced by black Americans was concerned with dramatizing the immorality and agony of slavery and refuting the romanticized, antebellum vision of slavery as presented by a host of white Southern writers of the so-called plantation tradition. Clearly, the Civil War was the central turning point for the freeing and proliferation of black writers. Outstanding works concerned with the question of slavery are the three autobiographies of the great abolitionist Frederick Douglass (q.v.), written at different times in his life. The first, *Narrative of the Life of Frederick Douglass, An American Slave*, was published in 1845 just after Douglass had escaped from slavery in Maryland. This was followed by enlarged versions in 1855 (*My Bondage and My Freedom*) and in 1881 (*Life and Times of Frederick Douglass*, finally revised in 1892). Another important work is *The Condition, Elevation, Emigration and Destiny of the Colored People of the United States* (1852), a history by Martin Robinson Delany (1812-85), who is now considered by some historians as the first major Negro nationalist. Abolitionist poet Frances E(llen) W(atkins) Harper (1825-1911) wrote with compelling clarity about the wretchedness of slavery; her *Poems on Miscellaneous Subjects* (1854), a volume of rhyth-

mically precise verse, was reprinted three times before 1870.

The historian, novelist, and playwright William Wells Brown (1816-84), who escaped from slavery in 1834, wrote the first novel by a black American, *Clotel, or the President's Daughter* (1853, London). The theme of *Clotel*, miscegenation (q.v.), or racial intermarriage, thereafter was dealt with frequently by other 19th-century Negro authors who, like Brown, were torn between their African heritage and a need for roots in the U.S.

Late 19th Century to 1920. In the late 19th and early 20th century, most major Negro writers came from the black middle class. Sociologist and writer W. E. B. Du Bois (q.v.), author of essays published under the title *Souls of Black Folk* (1903) and the novel *The Quest for the Silver Fleece* (1911), appealed to this successful class, which he called "the talented tenth", to lead the fight for equality for all black Americans. Much of the literature of the period reflects struggle, particularly the inner struggle of the black writer grappling with his anger toward himself and with his anger toward America. *The Garies and their Friends* (1857) by Frank J. Webb (d. 1940), and *Imperium in Imperio* (1899) by a Baptist preacher, Sutton Griggs (1872-1930), are examples of works that vacillate between a cry for militancy and a plea for acceptance. Another member of "the talented tenth", Charles Wadell Chesnutt (1858-1932), who practiced law in Cleveland, wrote about racial dilemmas in a volume of short stories, *The Conjure Woman* (1899), and in a novel, *The Marrow of Tradition* (1901). The outstanding black poet of the period was Paul Laurence Dunbar (q.v.), whose *Lyrics of a Lowly Life* (1896) first brought him national attention.

The Harlem Renaissance to 1950. From 1920 to 1930 there occurred a major outburst of creative activity by black Americans in all fields of art. The focus of this activity was Harlem (q.v.), in New York City; thus the period is often called the Harlem Renaissance. Black Americans were encouraged to celebrate their heritage, to become "The New Negro", to use a term coined in 1925 by sociologist and critic Alain LeRoy Locke (1886-1954) in a landmark anthology of black writers by the same title. From the Harlem Renaissance came Jean Toomer (1894-1967), author of *Cane* (1923), comprising short stories, poems, and a short novel; the Jamaican-born Claude McKay, author of the novels *Home to Harlem* (1928) and *Banjo* (1929); the well-known poet Countee Cullen, author of *Color* (1925) and *The Ballad of the Brown Girl* (1927); and the equally

famed poet and short story writer Langston Hughes (q.v.), author of *The Weary Blues* (1926) and numerous other volumes of poetry and creator of Jesse B. Simple of the Simple tales. As developed by Hughes, Simple is the symbol of the black American living in the contemporary urban ghetto.

During the Depression of the 1930's, and into the decade 1940-50, the novelists Zora Neal Hurston (1901-60), author of *Their Eyes Were Watching God* (1937), and Arna Bontemps (1902-73), author of *God Sends Sunday* (1931) and *Black Thunder* (1936), developed a sophistication in their works when dealing with social issues. In particular, the psychological and social realism of these writers go far beyond the "genteel tradition" of most earlier black literature. In

some critics as the finest work of fiction produced in post-World War II America; the novelist and essayist James Baldwin (q.v.), whose novel *Go Tell It On the Mountain* (1953) is perhaps the finest account in American literature of the black religious experience and whose books of essays (*Notes of a Native Son*, 1955, and *Nobody Knows My Name*, 1961) established him as one of the leading contemporary American essayists; and Imamu Amiri Baraka (born LeRoi Jones; 1934-), author of poems published under the title of *The Dead Lecturer* (1964), a play titled *The Dutchman* (1966), and a series of essays. Other important writers of the 1950's who have continued to be active are Chester Himes (1909-), a prolific author with several novels and an autobiography to his credit, and Alice Childress (1920-), who wrote *Trouble in Mind* (1955) and, later, books for children. Among the finest recent novelists and short-story writers are John Williams (1925-), author of *The Man Who Cried I Am* (1967), William Melvin Kelley, Jr. (1937-), author of *A Different Drummer* (1963), and James Alan McPherson (1943-), author of *Hue and Cry* (1969). Important poets include Robert Earl Hayden (1913-), author of *A Ballad of Remembrances* (1962), and Nikki Giovanni (1945-), author of *Black Feeling Black Talk* (1970). Eldridge Cleaver (1935-) contributed significant essays on American society in *Soul On Ice* (1967). Malcolm Little, also known as Malcolm X (q.v.), author with Alex Haley of *The Autobiography of Malcolm X*



Lorraine Hansberry

UPI

contrast, Richard Wright (q.v.), author of the novel *Native Son* (1940), portrayed the black experience in a starkly realistic manner, a style that many later Negro writers have emulated.

1950 to the Present. The civil-rights movement and the urban riots of the 1950's and 1960's created in the general public an increasing awareness of Negro authors. The recent writers have revealed more powerfully than their predecessors the exigencies and complexities of life as experienced by black Americans. Probably the most widely known and acclaimed of the current generation are the novelist Ralph Ellison (q.v.), whose *Invisible Man* (1952) is regarded by

Imamu Amiri Baraka

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NEGRO ORGANIZATIONS

(1965), and Claude Brown (1937-), author of *Manchild in the Promised Land* (1965), wrote moving personal accounts. An important play of the mid-1960's was *Ceremonies in Dark Old Men* (1965) by Lonne Elder III (1931-).

A number of prestigious literary prizes and awards have been received by Negro authors. A Pulitzer Prize went in 1950 to poet Gwendolyn Brooks (q.v.) for her collection *Annie Allen* (1949). Ralph Ellison received the National Book Award in 1953 for his novel *Invisible Man*. The play *A Raisin in the Sun* (1959) by Lorraine Hansberry (1930-65) won the New York Drama Critics Circle Award. A Pulitzer Prize went to Charles Gordone (1926-) for his play *No Place to Be Somebody* (1970). The 1973 Antoinette Perry award went to the Negro Ensemble Theater production of *The River Niger* by Joseph A. Walker (1935-).

The narrative and poetic tradition, begun orally by slaves more than 200 years ago, is being continued by such writers as the novelist Ishmael Reed (1938-), author of *Yellow Back Radio Broke Down* (1969), and the poet Mari Evans (1923-), who wrote *I Am a Black Woman* (1970), and the poet-novelist Maya Angelou (1928-), author of *I Know Why the Caged Bird Sings* (1969). Also notable in the 1970's were the playwright Ed Bullins (1935-), who wrote *The Duplex* (1971); the playwright Ron Milner (1938-), author of *What the Wine Sellers Buy* (1973); the poets Sonia Sanchez (1934-) and Haki Madhubuta (born Don L. Lee; 1942-); the novelist John Oliver Killens, author of *The Cotillion* (1971); and Margaret Walker (1915-), whose poem "For My People" has become one of the centerpieces of contemporary black literature. The black literary tradition remains rich in complexity, imbued with a sense of the need to identify those human emotions common to all and to interpret those situations peculiar to black Americans. R.C.B. & J.D.W.

NEGRO ORGANIZATIONS, associations formed in the United States for the purpose of protecting and advancing the political, economic, cultural, and social interests of Negroes. Such organizations are of three types: those formed to assure the economic and social rights of groups of Negro professionals, those concerned with obtaining political and economic fairness for Negroes, and those that are primarily social or fraternal in purpose.

Professional and Civil-Rights Organizations. Negro professional organizations arose during the 19th century in connection with the establishment of independent religious organizations chiefly comprising Negro members; see for ex-

ample **AFRICAN METHODIST EPISCOPAL CHURCH**. Composed of such professionals as physicians, teachers, and businessmen, they were designed to provide services that were furnished inadequately to Negroes by the white majority. Many professional organizations were formed as parallel associations to similar white groups, which had often adopted discriminatory practices toward Negro professionals. Important Negro associations of this type include the National Bar Association, founded in 1925 and comprising Negro members of the legal profession. The National Council of Negro Women, founded in 1935, and the Black Academy of Arts and Letters, founded in 1969 as successor to the American Negro Academy (1897-1923), have been concerned with the advancement of Negro culture.

Negro professional organizations concern themselves with the elimination of discrimination against Negroes in general, as well as with the promotion of their own professional interests. This concern, which in the 19th century had been expressed chiefly through antislavery organizations (see **ABOLITIONISTS**), led, in the early 1900's, to the establishment of a number of organizations devoted to the progress of the black people throughout the U.S. The National Negro Business League, founded in 1900 by the educator Booker Taliaferro Washington (q.v.), advocated a policy of self-help for Negroes in America; see **WASHINGTON-DUBOIS CONTROVERSY**. In contrast, the Universal Negro Improvement Association, incorporated in New York in 1916 by the Jamaican-born Marcus Garvey (q.v.), urged the development of economic self-sufficiency among Negroes in preparation for a return to the ancestral homelands in West Africa. A policy of self-sufficiency and separatism was also subsequently proposed by the organization known as the Black Muslims (q.v.), a quasi-religious group that favored the establishment of a section of the U.S. to be inhabited and controlled exclusively by Negroes.

Most notable among the organizations established during this period were the National Association for the Advancement of Colored People (q.v.), known as the N.A.A.C.P., and the National Urban League (q.v.), founded in 1910 to represent the interests of Negroes in large cities. The former, an interracial group comprising both Negro and white members, works chiefly through litigation and the judicial process to eliminate discrimination in such areas as education, housing, and employment. It was instrumental in the legal efforts that led to the 1954 decision by the Supreme Court of the

United States (q.v.) outlawing racial segregation in public schools; see EDUCATION. The National Urban League has become increasingly concerned with economic opportunities for Negroes.

A more comprehensive approach to the elimination of discrimination, often involving the use of active social protest, resulted in the development of such organizations as the Congress of Racial Equality (CORE) founded in 1942 to promote the full equality of Negroes in all areas of American life. During the late 1960's this organization largely restricted its membership to Negroes, advocating a policy of racial separatism in economic and social matters. Also during the 1950's, which were marked by increasingly active movements against racial discrimination, the civil-rights leader The Rev. Martin Luther King, Jr. (q.v.) founded the Southern Christian Leadership Conference (S.C.L.C.). The organization was established to secure equality of opportunity through active but nonviolent protest. A subsequent organization, the Student Non-Violent Coordinating Committee (S.N.C.C.), later advocated a more militant approach to the advancement of Negro interests; see STUDENT NATIONAL COORDINATING COMMITTEE. Such an approach was also proposed by the Black Panther Party (q.v.), founded in 1966. Many Negro organizations, however, continue to favor the advancement of Negro interests through the peaceful reform of contemporary society and through the opening of economic and educational opportunities to Negroes.

Fraternal Organizations. Many early black organizations were devoted to both racial advancement and to simple social fellowship. The first fraternal organization, a Negro Masonic lodge, was chartered and organized in Boston in 1787 under the American abolitionist Prince Hall, a veteran of the American Revolution. A black chapter of the Grand Order of Odd Fellows came into existence in New York in 1843, of the Knights of Pythias (q.v.) in 1880, and of the Improved Benevolent and Protective Order of Elks of the World in 1898; see BENEVOLENT AND PROTECTIVE ORDER OF ELKS; FREEMASONRY; ODD FELLOWS, INDEPENDENT. College fraternities and sororities were a 20th-century development, with Sigma Pi being founded in 1904, Alpha Phi Alpha in 1906, and three others within the following decade.

See CIVIL RIGHTS AND CIVIL LIBERTIES; DISCRIMINATION; NEGROES IN THE UNITED STATES. B.Q.

NEGROPONT. See EUBOEA.

NEGRO, RIO, river in Argentina, formed by the junction of the Limay and Neuquén rivers in

w. Rio Negro Province, and flowing generally s.e. to the Atlantic Ocean near Viedma. It is about 400 mi. long.

NEGRO, RIO, river in South America. It rises as the Guainía R. in s.e. Colombia, flows e., forming part of the boundary between Colombia and Venezuela, then s. into Brazil, and s.e. until it empties into the Amazon at Manaus, after a course of about 1400 mi. Its chief tributaries are the Uaupés and Branco rivers; the Brazo Casiquiare connects the Negro with the Orinoco R. **NEGROS,** island of the Republic of the Philippines, between Panay and Cebu islands. The island is mountainous, rising to 8087 ft. above sea level at Canalaon Peak. Tobacco and sugar cane are the chief products. The island of Negros comprises the provinces of Negros Occidental and Negros Oriental. Area, 4905 sq.mi.; Pop. (1970) 2,219,022.

NEHEMIAH, book of the Old Testament (see BIBLE), in the King James Version, THE BOOK OF NEHEMIAH; in the Douay Version, used by Roman Catholics, it is entitled The Book of Nehemias (see also books of ESDRAS). The book of Nehemiah belongs to the third part, the Writings, of the Hebrew canon (see BIBLE, CANON OF THE). Since the 4th century A.D., it has appeared in Christian versions of the Old Testament as a separate work; in the King James Version, it follows the two books of the Chronicles and the book of Ezra (qq.v.). (In Hebrew Bibles, it first appeared as a separate book in the 15th century.) Originally, however, it was part of a larger work, which included, in addition to Nehemiah, 1 and 2 Chronicles, and Ezra. These four books together give an account of Jewish history from Adam (see ADAM AND EVE) to the last third of the 5th century B.C. See also JEWS.

Authorship. Modern scholars regard all four books as probably being the work of one author or author-editor. He is commonly referred to as "the Chronicler", is held by many scholars to have been a Levite (see LEVITES), and, according to recent scholarship, is thought to have composed or compiled the entire work about 300 B.C. Although some scholars have considered the work as original, with little if any dependence on historical or sacerdotal sources, most scholars believe that "the Chronicler" did draw upon a number of older sources, among them, perhaps, Temple records, the personal memoirs of the Hebrew priest and reformer Ezra, and the personal memoirs of the Jewish leader Nehemiah (qq.v.). It is widely supposed that the author incorporated a considerable portion of Nehemiah's own memoirs in the book now bearing his name.

NEHEMIAH

Content. Nehemiah opens with an account of how Nehemiah, while serving as butler to the Persian king (probably Artaxerxes I, r. 464–424 B.C.), learned of the distressing conditions in Jerusalem during the Babylonian captivity (q.v.). Shortly thereafter, he petitioned the king for permission to return to his ancestral home in order to help restore the city. The king granted him a limited leave of absence, and sent him back to Judah (q.v.) as governor. In Jerusalem, Nehemiah persuaded the populace to undertake the restoration of the city walls, a task completed under his leadership in “fifty and two days” (6:15), despite the opposition of neighboring peoples. Nehemiah instituted religious and social reforms, among them: a prohibition against high interest rates (which had led to the enslavement of lower-class Hebrews), and the cancellation of debts owed by the poor (chapter 5); the exclusion of non-Israelites from “the congregation of God” (13:1); an injunction against work or trade on the Sabbath (13:15–21); and the prohibition of intermarriage with non-Israelites (13:23–28). He also took steps to assure the Hebrew occupancy of Jerusalem (chapter 11), to maintain the rebuilt Temple and the Temple services (9:38–10:39), and, in conjunction with Ezra, to establish the proper manner of reading “the book of the law of Moses” (8:1).

The sections of the book supposed by various scholars to derive almost wholly from Nehemiah’s own memoirs are 1:1–7:5, and chapters 11–13. The remainder probably was drawn mainly from the Ezra material (particularly Neh. 7:7–10:39), and from both contemporaneous and later Temple records.

NEHEMIAH, or (in the Douay Bible) **NEHEMIAS**, Jewish leader during the 5th century B.C. He held a position of honor in the court of the Persian king Artaxerxes I (r. 464–424 B.C.) and in 444 B.C. was appointed by the king to the governorship of Judea (in present-day Israel and Jordan), with authorization to rebuild Jerusalem. The rebuilding of Jerusalem’s walls and the reforms made during his administration of Judea are recounted in the Old Testament book that bears his name; see books of **EZRA**; **NEHEMIAH**.

NEHRU, Jawaharlal (1889–1964), Indian nationalist leader and statesman, born in Allahabad. He went to England at the age of sixteen and was educated at Harrow School and at the University of Cambridge. Returning to India in 1912, he practiced law for some years and in 1919 joined the Indian National Congress, the principal nationalist organization of India, led by Mohandas Karamchand Gandhi (q.v.). Nehru soon became one of the leaders of the national-



Jawaharlal Nehru in 1960

United Nations

ist movement; between 1921 and 1934 he was imprisoned seven times by the British administration for his activities on behalf of Indian independence. He served as secretary of the Congress Party from 1929 to 1939, and in the latter year was elected its president, a position he subsequently held three times. Although Nehru remained a supporter of Gandhi until the latter’s death in 1948, he did not share Gandhi’s belief in passive resistance as a means of driving the British out of India. Nehru put forth a militant program involving the adoption of all possible measures short of armed resistance to the British.

In 1942 he replaced Gandhi as the recognized leader of the National Congress Party. Four years later, when the British began their preparations for withdrawal from India, Nehru was elected vice-president and minister for external affairs and Commonwealth relations in the interim government that had been set up to organize a permanent, independent Indian government. During the following year Nehru attempted to prevent the partition of India into separate Hindu and Muslim states, but his efforts proved unsuccessful and a separate Muslim state known as Pakistan (q.v.) was set up. In August, 1947, following the final withdrawal of the British and the establishment of India as a self-governing dominion within the Commonwealth, Nehru was elected the first prime minister of India. He continued in that post when India became an independent nation in 1950 and was returned to

office repeatedly until his death on May 27, 1964, in New Delhi.

As prime minister, Nehru was deeply involved in carrying out India's five-year plans and pursuing a policy of peaceful coexistence with nations of every political tendency. He supported the United States resolution on Korea (q.v.) in 1950, opposed the British and French move in 1956 at the Suez Canal (q.v.), and told an aggressive China in 1959 that he would defend India's borders with armed force. Under his guidance India became an influential force with the unaligned nations of Asia and Africa. His writings include letters published under the title *Glimpses of World History* (1936) and an autobiography published in the U.S. as *Toward Freedom* (1941); his addresses and articles were collected and published under the titles *The Unity of India* (1937-40) and *Independence and After, 1946-1949* (1950).

NEIKIANG, city of the People's Republic of China, in Szechwan Province, on the To R., 80 miles N.W. of Chungking. It is a rail junction and a sugar-milling and cotton-weaving center in an area that produces sugarcane, rice, cotton, oranges, sweet potatoes, beans, and salt. The name is also spelled Nei-chiang. Pop. (1970 est.) 240,000.

NEJD. See SAUDI ARABIA.

NELSON, river of N.E. Manitoba, Canada, 644 km (400 mi.) long. The river rises in Lake Winnipeg and flows N.E. to Hudson Bay; in several places it widens to form large lakes. Major hydroelectric facilities are located on the river at Kettle Rapids and Grand Rapids. With the Bow, South Saskatchewan, and Saskatchewan rivers and Lake Winnipeg, the Nelson forms a 2574-km (1600-mi.) -long continuous waterway.

NELSON, Horatio (1758-1805), British admiral and naval hero, born in Burnham Thorpe, Norfolk, England, and educated briefly at Norwich, Downham, and North Walsham. He entered the British navy in 1770, serving under his uncle, Captain Maurice Suckling (1725-78). In the ensuing years Nelson gained much naval experience through service on a merchant vessel, on an arctic expedition, and in the East Indies and the West Indies. By 1779 he had attained the rank of captain. Subsequently he saw battle service in the West Indies (1780), was chosen to instruct Prince William, later William IV (q.v.), King of Great Britain, in naval tactics, studied naval matters in France, and in 1784 commanded the British frigate *Boreas*, stationed at Antigua, West Indies. In 1787, while stationed in the West Indies, Nelson married Frances Nisbet (1761-1831), the widow of a British physician.

Service. Nelson's services to the British nation were contributed in the course of the French Revolution and the Napoleonic Wars (qq.v.). Serving under Rear Admiral Samuel Hood (1724-1816), in 1793 he assisted in the occupation of the city of Toulon by allied British and Spanish forces. In the course of a visit to Naples, from which he conveyed troops to help the British at Toulon, Nelson first became acquainted with Lady Hamilton (q.v.), wife of the British ambassador at Naples; Lady Hamilton subsequently became Nelson's mistress, and his career was considerably influenced by her advice and help. After the British allies were driven from Toulon by Napoléon Bonaparte, later Napoleon I (q.v.), Emperor of France, Nelson assisted Hood in the taking of the towns of Bastia and Calvi in Corsica, and in occupying the island (1794). At Calvi he was wounded in the right eye, the sight of which he eventually lost.

Nelson was made a commodore in 1796. The following year he played a prominent part in the victory off Cape Saint Vincent, Portugal, of the British fleet under John Jervis (1735-1823), later Earl Saint Vincent, over the fleet of Spain, then allied to France. In July, 1797, Nelson led a rash attack by small boats on the town of Santa Cruz de Tenerife in the Canary Islands, a Spanish possession; the attack failed, and Nelson received a wound in the right arm that resulted in amputation of the arm. The following year he was sent to discover the purpose of the great French fleet gathering at Toulon. Nelson's ships, reconnoitering off Toulon, were scattered by a storm, and before he could resume his position, the French fleet sailed. Nelson discovered that it had gone east, carrying Bonaparte's troops for an invasion of Egypt, and set out in pursuit.

The French fleet had discharged its troops before Nelson came up with it at Abukir Bay; in the Battle of the Nile, on Aug. 1-2, 1798, he destroyed most of the French vessels; the victory cut Napoleon's line of communication with France, and eventually was responsible for Bonaparte's withdrawal from the Middle East in spite of his military victories there; see NILE, BATTLE OF THE. Nelson then proceeded to Naples, from which the Neapolitan royal family had been driven by French troops and Neapolitan sympathizers with the French Revolution; he was prominent in the action against Naples which resulted in the restoration of the royal family, and for his services he was created (1800) Duke of Bronté by Ferdinand I (q.v.), King of Naples. He returned to England the same year, and the following year was separated from his wife.



Nelson's Column at Trafalgar Square, London, England.

In 1801 Nelson became a vice-admiral, but in spite of his rank accepted service under Sir Hyde Parker (1739–1807) when the latter was placed in command of the fleet sent to the Baltic Sea to compel Denmark and Sweden to discontinue their economic aid to France. In the Battle of Copenhagen, in which the British fleet destroyed the Danish in the harbor of the capital, Nelson, although second in command, took entire charge of the British operations; when his attention was called at the height of the battle to Parker's signal for the British ships to withdraw, Nelson placed a telescope to his blind eye and declared he could not see the signal. Later that year he was created viscount.

Trafalgar. Nelson was in England at the time of the Treaty of Amiens (1802–03) which temporarily ended the fighting between England and France; see AMIENS, TREATY OF. When war broke out again in 1803 he was appointed commander of the British Mediterranean fleet. He blockaded Toulon, where a large French fleet under Vice-Admiral Pierre Charles de Villeneuve (1763–1806) was preparing to invade England. Nelson forced the French fleet to remain in

Toulon for two years, but it escaped in 1805 and made for the West Indies. Nelson set out in pursuit, but the French fleet eluded him and, sailing back to Europe, took refuge in Cádiz, where it was joined by a number of Spanish ships. The British blockaded the city, but Villeneuve finally broke out of the harbor and gave battle off Cape Trafalgar (q.v.), in Spain. In the Battle of Trafalgar, on Oct. 21, 1805, Nelson overwhelmingly defeated the combined French and Spanish fleets, leading the attack himself in his flagship *Victory*; he was mortally wounded by a French sharpshooter, however, and died as the battle ended. The British victory put an end to Napoleon's plans for invading England.

Nelson is regarded as the most famous of all British naval leaders and as one of the most noteworthy in world history. He was buried in Saint Paul's Cathedral. In November, 1805, in recognition of his services, his brother William Nelson (1757–1835) was made Earl Nelson of Trafalgar. In 1849 a monument known as the Nelson Column was erected to Admiral Nelson in Trafalgar Square, London.

NELSON, Thomas (1738–89), American patriot, born in Yorktown, Va., and educated at the University of Cambridge. In 1761 he returned to Yorktown and served several terms in the Virginia House of Burgesses. From 1775 to 1777 he served as a delegate to the Continental Congress, and he was one of the signers of the Declaration of Independence (qq.v.). He commanded the Virginia State forces from 1777 to 1782 during the American Revolution. Nelson's patriotic use of his own money to pay public debts left him impoverished, and his last years were spent in great privation.

NEMATHELMINTHES. See THREADWORM.

NEMATODES or **ROUNDWORMS**, common name for any of the unsegmented terrestrial, freshwater, or saltwater worms constituting the class Nematoda. Nematodes are almost worldwide in distribution. Many of them are economically and medically important, living as parasites in plants and domestic animals, and producing disease in man. Roundworms are cylindrical, tapering creatures that secrete an elastic cuticle about themselves. This cuticle is molted four times during the lifetime of a roundworm. Nematodes range in size from species no more than $\frac{1}{50}$ in. long to species attaining a length of 4 in. The worms have separate sexes, and fertilization is internal. The young, which resemble the adults, develop without metamorphosis.

Classification of the nematodes is a subject of some controversy among zoologists today.

Many include the Gordian worms (see *HAIR-WORM*) as a subclass of nematodes; most zoologists, however, group the Gordian worms in a class by themselves, subdividing the other nematodes into numerous orders, the most important of which follow.

Ascaroidea, containing *Ascaris* (q.v.) and *Toxocara canis*, the common worm of puppies; *Rhabditoidea*, containing *Strongyloides*, a worm parasitic on man; the eelworms, *Heterodera*, producing root knot of cotton (q.v.); and *Tylenchus*, producing earcockle of wheat.

Strongyloidea, containing the hookworms (q.v.), and *Strongylus*, common intestinal parasites of horses.

Filarioidea, the filaria (q.v.).

Trichinelloidea, the trichina worm *Trichinella*, cause of trichinosis (q.v.), and the whipworm. **NEMESIS**, in Greek mythology, personification of divine justice and the vengeance of the gods, sometimes called the daughter of Night. She represented the righteous anger of the gods against the proud and haughty and against breakers of the law, and was the distributor of good or bad fortune to all mortals. No one could escape her power.

NEOCLASSICISM. See **CLASSICISM**.

NEODYMIUM, metallic element, member of the cerium subgroup of the rare earths (q.v.), with at.no. 60, at.wt. 144.26, b.p. above 3030° C. (5486° F.), m.p. 1024° C. (1875.2° F.), sp.gr. 7.0⁹⁰, and symbol Nd. It was isolated in 1885 by the Austrian chemist Baron Carl Auer von Welsbach (q.v.), who separated it from praseodymium. Neodymium and praseodymium had previously been regarded as a single element, called didymium. Neodymium ranks twenty-ninth in order of abundance of all the elements in the crust of the earth. It is slightly yellow in color. It forms trivalent salts, which are rose red or reddish violet in color. The metal and its compounds have no important commercial application.

NEOLITHIC, designating the period in the history of mankind after the Mesolithic and before the Bronze Age, and characterized by advanced stone tools, the invention of the wheel, pottery, the domestication of animals, and the invention of farming. See **ARCHEOLOGY**.

NEON, gaseous element with at.no. 10, at.wt. 20.182, b.p. -246.1° C. (-410.10° F.), m.p. -248.6° C. (-415.5° F.) at 324 mm pressure, sp.gr. 0.9000, and symbol Ne. It is one of the inert gases (q.v.) and constitutes 18 parts per 1,000,000 in the gaseous portion of the atmosphere. Neon was first separated from other inert gases in 1898 by the British chemists Sir William

Ramsay (q.v.) and Morris William Travers (1872-1961). It is a colorless, odorless, monatomic gas. Neon occurs naturally in three stable isotopic forms: neon-20, which is the most abundant isotope, neon-22, and neon-21. The first demonstration of the existence of a stable isotope (q.v.) in an element was performed with neon in 1912. Neon produces a crimson glow in a vacuum electric discharge tube and is used extensively in the familiar neon light of advertising displays. The term "neon light" is often but incorrectly applied to discharge tubes filled with gases other than neon that produce a colored glow; see **NEON LAMP**. Liquid neon is used as a cryogenic refrigerant; see **CRYOGENICS**. It has over forty times more refrigerating capacity per unit volume than liquid helium. R.Ho.

NEON LAMP, glass bulb containing the gaseous element neon (q.v.) at low pressure, and two metallic electrodes; see **ELECTRODE**. The lamp produces a dim orange glow when an electric current, applied across the electrodes, is raised in voltage to the point at which it ionizes the gas in the tube; see **ELECTRIC LIGHTING**; **IONIZATION**. The voltage at which the lamp glows varies with the design of the tube. When gas in the tube is ionized, the voltage drop across the tube is nearly constant, regardless of the amount of current flowing through the tube. For this reason neon lamps are often used in electronic devices as voltage regulators to provide a constant direct-current voltage. These lamps are also used sometimes as pilot lamps to indicate whether or not a piece of electrical equipment is drawing current.

Another kind of neon lamp is a glass tube containing ionized neon at very low pressure. The tube shines with a brilliant red glow if a high-voltage alternating current is applied to electrodes sealed in the ends of the tube. Neon lamps of this type, and other lamps using argon (q.v.), are used extensively for advertising signs and in pop art (q.v.). See **FLUORESCENCE** AND **PHOSPHORESCENCE**.

NEOPLASM. See **CANCER**.

NEOPLATONISM, collective designation for the philosophical and religious doctrines of a heterogeneous school of speculative thinkers who sought to develop and synthesize the metaphysical ideas of the Greek philosopher, Plato. Such synthesis occurred especially in Alexandria and included both Hellenistic Judaism, as exemplified by the Jewish-Hellenistic philosopher Philo Judaeus of Alexandria, and other outlooks.

The Neoplatonic Doctrine. The doctrine kept its essentially Greek character, however. By extension, the term is applied to similar metaphys-

NEOPLATONISM

ical theories expounded in medieval, Renaissance, and modern times. Neoplatonism is a type of idealistic monism in which the ultimate reality of the universe is held to be an infinite, incogitable, perfect One; see IDEALISM; METAPHYSICS; MONISM. From this One emanates nous (pure intelligence), whence in turn is derived the world soul, the creative activity of which engenders the lesser souls of human beings. The world soul is conceived as an image of the nous, even as the nous is an image of the One; both the nous and the world soul, despite their differentiation, are thus consubstantial with the One. The world soul, however, because it is intermediate between the nous and the material world, has the option either of preserving its integrity and imaged perfection or of becoming altogether sensual and corrupt. The same choice is open to each of the lesser souls. When, through ignorance of its true nature and identity, the human soul experiences a false sense of separateness and independence, it becomes arrogantly self-assertive and falls into sensual and depraved habits. Salvation for such a soul is still possible, the Neoplatonist maintains, by virtue of the very freedom of will that enabled it to choose its sinful course. The soul must reverse that course, tracing in the opposite direction the successive steps of its degeneration, until it is again united with the fountainhead of its being. The actual reunion is accomplished through a mystical experience in which the soul knows an all-pervading ecstasy; see MYSTICISM.

Doctrinally, Neoplatonism is characterized by a categorical opposition between the spiritual and the carnal, elaborated from Plato's dualism of Idea and Matter; by the metaphysical hypothesis of mediating agencies, the nous and the world soul, which transmit the divine power from the One to the many; by an aversion to the world of sense; and by the necessity of liberation from a life of sense through a rigorous ascetic discipline.

History. Neoplatonism began in Alexandria, Egypt, in the 3rd century A.D. Its founder was the Alexandrian philosopher Ammonius, surnamed Saccas (fl. 3rd cent.), that is, "the sack bearer", an allusion to his early occupation as a porter. The foremost exponent of Neoplatonism was the Roman philosopher Plotinus, who was born in Egypt, studied with Ammonius at Alexandria, and carried the Neoplatonic doctrine to Rome, where he settled. His major works, the *Enneads*, contain a comprehensive exposition of Neoplatonic metaphysics. Other important Neoplatonic thinkers were the Syrian-Greek scholar and philosopher Porphyry (about 232-about

304), the Syrian-Greek philosopher Iamblichus (d. about 333), and the Greek philosopher and mathematician Proclus. The elements of asceticism and unworldliness in Neoplatonism appealed strongly to the Fathers and Doctors of the Christian Church. The early Christian prelate, theologian, and philosopher Saint Augustine, in his *Confessions*, acknowledged the contribution of Neoplatonism to Christianity and indicated the profound influence exerted by its doctrines upon his own religious thinking. Although a number of medieval theologians and philosophers, notably the German mystic Johannes Eckhart (1260-1327), were deeply influenced by Neoplatonism, Roman Catholic dogmatists condemned its unorthodox tenets. In the 15th century, however, Neoplatonism became more generally accepted. The German Roman Catholic speculative philosopher Nicholas of Cusa and other mystics sought to overcome the doubt arising from the limitations of human knowledge by espousing the theory of man's direct intuition of God, a theory closely akin to the Neoplatonic doctrine that the soul in a state of ecstasy has the power to transcend all finite limitations. The Humanists (see HUMANISM) of the Italian Renaissance, in their reaction against the previously dominant rationalistic philosophy (see RATIONALISM) of the Greek philosopher Aristotle, turned to the idealistic metaphysics of Plato, and thence to Neoplatonism. Notable in this connection was the Italian scholar Marsilio Ficino (1433-99), who, under the patronage of the wealthy nobleman Cosimo di Medici (see under MEDICI), translated and annotated the works of the Roman scholar Plotinus (205?-70) and the Greek philosophers Porphyry (232?-304) and Iamblichus (d. 333). In England, the 17th-century Cambridge Platonists (q.v.) exhibited marked affinities with Neoplatonic philosophers. A number of 19th- and 20th-century thinkers and writers have been influenced by Neoplatonism, among them the British poets William Wordsworth, John Keats, and Percy Bysshe Shelley.

See separate biographies for persons mentioned without their birth and death dates.

S.Sa.

NEOPRENE. See RUBBER, SYNTHETIC: *Types of Synthetic Rubber.*

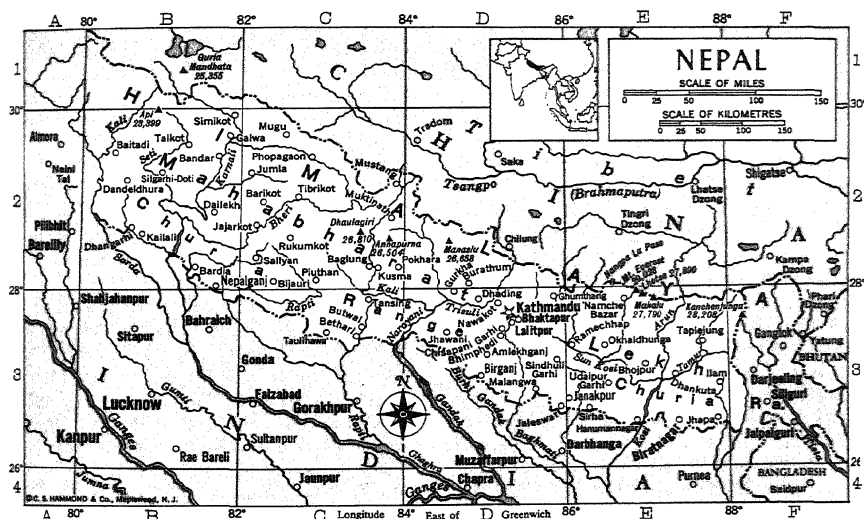
NEOPTOLEMUS, also called PYRRHUS, in Greek legend and poetry, the son of the warrior Achilles (q.v.) and Deidamia of Scyros. Neoptolemus was reared at Scyros and, after the death of Achilles, was taken to Troy by the hero Odysseus (see ULYSSES) in the final year of the Trojan War (q.v.), because it was prophesied

that the Greeks could not take Troy without the help of Neoptolemus. He was among the warriors who entered Troy in the Trojan horse (q.v.) and when the city was captured, he killed Priam (q.v.), King of Troy. Neoptolemus never returned to Scyros, but settled instead in Epirus. He was later considered the ancestor of the Molossian kings of that region. He married Hermione (see under HERMIONE), daughter of Menelaus (q.v.) and Helen of Troy (q.v.), King and Queen of Sparta. Slain at Delphi, Neoptolemus was buried within the precincts of the temple there, and festivals were held in his honor every eight years.

NEOSHO, river rising in Morris County, Kans., flowing generally s.e., and entering n.e. Oklahoma. In Oklahoma three flood control and hydroelectric power dams form Lake O' the Cher-

okees, Markham Ferry Reservoir, and Fort Gibson Reservoir. The Neosho joins the Arkansas R. near Fort Gibson. The Neosho R. is about 450 mi. long.

NEPAL, kingdom of Asia, bounded by China on the n. and by the Republic of India on the e., s., and w. It lies between about lat. 26°20' N. and lat. 30°10' N. and long. 80°15' E. and long. 88°15' E. The main range of the Himalaya extends along the n. border. In this region are Mt. Everest and Kanchenjunga, respectively the highest and third-highest peaks in the world, Mt. Dhaulagiri, and several other peaks with elevations of more than 20,000 ft. The mountainous central portion, with ranges averaging 8000 ft. in height, has small, fertile, and thickly populated valleys, notably the Valley of Nepal, or Katmandu, in the e. In the extreme s. the terrain forms part of the



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NEPAL

Terai, a region of swampy lowlands, jungles, and areas suitable for cultivation. The total area of Nepal is 54,600 sq.mi.

Population. The Nepalese are largely of Mongoloid origin; however, the dominant Gurkhas originated in India. The Newar and Sherpa are major native tribes. Hinduism is the leading religion, but Buddhism is common, especially in the remoter areas. The population of Nepal (census 1971) was 11,290,000. Kathmandu (q.v.) is the capital and the largest city. Other cities of appreciable population include Bhaktapur and Lalitpur (qq.v.).

The official language is Nepali, which is derived from Sanskrit, but more than thirty languages are used. About 12 percent of the population is literate. In the late 1960's, according to the latest available statistics, Nepal had about 450,000 students in primary schools, 100,000 in secondary schools, and 17,000 in colleges and other higher schools. An additional 100,000 attended vocational schools. The first university in the country, Tribhuvan University, was founded in 1960.

The Economy. Prior to 1951 Nepal had virtually no roads, communications, electric power, or industry. The three major economic resources, forests, hydroelectric potential, and tourism, were largely undeveloped. The country had only a subsistence agrarian economy. Although Nepal remains one of the least developed countries in Asia, it has made notable progress in the past two decades. Large-scale economic assistance, mainly from the United States and India, has contributed to this development. Successive five-year plans have called for substantial expenditures. The unit of currency is the rupee, consisting of 100 pice (10.1 rupees equal U.S.\$1; 1973). In a recent year annual budget figures showed about \$49,000,000 in revenue and expenditures of about \$76,700,000, of which \$62,800,000 was earmarked for economic development. The deficit is made up by foreign aid and domestic loans.

Agriculture remains the principal activity, providing more than two thirds of the national income. Leading crops are rice, jute, sugarcane, corn, potatoes, and medicinal herbs. Newly established industries include jute and sugar mills, match, leather, and shoe factories, and chemical works. Several hydroelectric projects are in operation, and others are under construction. A start has been made toward exploitation of the forest resources, and tourist centers are being developed.

Foreign trade is conducted almost entirely with India. Exports are mainly food grains, jute,

oilseeds, medicinal herbs, and timber. The annual value of export trade in the late 1960's was about \$63,000,000. Imports consist largely of manufactured goods, with textiles the largest single item. Annual value of imports was about \$88,000,000.

Transportation and Communications. Because of the rugged terrain, Nepal is deficient in modern transportation facilities. In the early 1970's about 65 mi. of railroad and 500 mi. of vehicular highways were in operation. With the cooperation of the U.S. and India, 900 mi. of additional roads were under construction. Most goods are still transported by porters and pack animals. About 6200 telephones are in use, and Nepal has telegraph links with India and Bangladesh. The Kathmandu radio station broadcasts in Nepali and English. Radio sets total about 70,000.

Government. Nepal is a constitutional monarchy. The ruling sovereign is King Birendra, who succeeded to the throne in 1972. A constitution, proclaimed in 1962, established a non-party government based on the traditional *panchayat*, or village council, democracy. Village *panchayats* elect district *panchayats*, which in turn elect the zonal *panchayats*. These groups elect the ninety members of the National *Panchayat*, which forms the national legislature. The king retains executive power and chooses a council of ministers from among the members of the National *Panchayat*.

History. Little of an authentic nature is known regarding ancient and early-medieval Nepalese history. Forces under a raja of the Rajput military caste (q.v.), in flight from invading Muslims, overran Nepal in 1324, and his descendants continued to rule until 1768. In the latter year the country was seized by invading Gurkhas (q.v.). Following consolidation of their power, in 1790 the Gurkhas attempted the conquest of Tibet, but they were defeated two years later by a Chinese force, which briefly occupied part of Nepal. Relations between the Gurkhas and the British in India were governed by treaty from 1791 to 1803, when, as a result of frontier disputes, the British withdrew their representative from the Nepalese capital. Friction increased steadily during the next decade, and finally, in November, 1814, the British declared war on Nepal. The ensuing conflict ended in victory in 1815 for the British. Under the terms of the peace agreement, ratified in 1816, the Nepalese government relinquished an extensive section of the Terai and other border territories. Pro-British and anti-British groups in the ruling circles of Nepal contended for power during the



A United Nations geological survey party camped in the vicinity of Mt. Everest.
United Nations

next thirty years. In 1846 the pro-British army leader Sir Jung Bahadur (1816–77) of the Rana family seized control of the government and became prime minister. Jung Bahadur initiated a long period of political domination by the Rana family, in which the office of prime minister was made hereditary. In 1854 Jung Bahadur launched a successful invasion of Tibet. By the provisions of the peace treaty in 1856 Tibet granted diplomatic and commercial rights to Nepal and agreed in addition to the payment of a yearly tribute. Nepal rendered valuable assistance to the British during the Indian Mutiny (q.v.), 1857–59, and during World War I. The British government reaffirmed the independence of Nepal by the terms of a treaty concluded in 1923. Nepal supported the Allied cause during World War II. The Nepalese and United States government established diplomatic relations in 1948.

The hereditary Rana regime was subjected to increasing criticism during 1949, particularly by dissidents residing in India. The political-reform movement, which was approved by the Indian government and directed by the newly created Nepalese Congress Party, won the support of King Bir Bikram Tribhuvana (1906–55). Like his predecessors under the Ranas, he possessed purely nominal powers. His intervention in domestic politics deepened the crisis, however, and on Nov. 7, 1950, Prime Minister Maharaja Mohan Shumsher Rana removed him from the throne. A few days later the king fled to India,

and Nepalese Congress insurgents began military operations along the southern frontier. The Indian prime minister Jawaharlal Nehru (q.v.), refusing to recognize King Tribhuvana's deposition, requested the reorganization of the Nepalese government along democratic lines and the election of a constituent assembly.

Prime Minister Rana acceded to Nehru's suggestions on Jan. 8, 1951. Within the next few weeks representatives of the Congress Party were installed in the cabinet. The king returned to the Nepalese capital on Feb. 15. Friction between the Rana and Congress Party factions culminated on Nov. 16, 1951, in the removal of Prime Minister Rana from power and the formation of a Congress Party–Independent cabinet headed by the Congress Party leader Matrika Prasad Koirala (1912–).

As a first step toward the establishment of constitutional rule, the king convened an advisory assembly at Kathmandu on July 4, 1952. Supporters of the old aristocratic regime opposed the democratic trend, and the new system began to break down. During the remainder of the decade political unrest continued, with several changes of government and intervals in which the king resumed direct rule. King Tribhuvana died in 1955 and was succeeded by his son Mahendra Bir Bikram (1920–72). In February, 1958, the king promulgated the country's first democratic constitution and the next year the

first Nepalese elections were held for a parliament consisting of two houses. The result was an overwhelming victory for the Congress Party, and Koirala again formed a government. In December, 1960, declaring that the regime had been corrupt and inefficient, King Mahendra dismissed the government and suspended parliament. The king, considering the parliamentary system unsuited to Nepalese conditions, proclaimed a new constitution in 1962. The government then instituted a number of social reforms, including a program of land reform and a modernization of the legal code to remove the basis for caste discrimination.

Nepal and the People's Republic of China reached agreement in 1961 on their Himalayan boundary. In 1967 King Mahendra inaugurated a 67-mi. highway linking Kathmandu with China. Built with Chinese financial and technical aid, it is the first trans-Himalayan road capable of accommodating two-way traffic.

King Mahendra died on Jan. 31, 1972, and his son, Birendra Bir Bikram Shah Dev (1946-), was crowned on Feb. 24, 1975.

NEPENTHES, genus of climbing "pitcher plants", in the family Nepenthaceae and sometimes referred to as "monkey cups". The genus, which contains about sixty species, is native to bogs (see BOC) in the East Indies, the Malagasy Republic, the Philippines, and northern Australia, and is widely cultivated in greenhouses. The plant's flowers are inconspicuous and its fruits are leathery capsules. It grows long leaves with a midrib, or central vein, that extends beyond the tip of the leaf as a tendril. The end of this tendril is expanded and hollowed out to form a pitcher-like cup, which varies from the size of a thimble in some species to the size of a quart container in others. The rim of this cup is corrugated and contains numerous nectar-secreting glands. The interior of the cup just below the rim is slippery, causing insects that visit the pitchers in search of nectar to fall into the interior. The bottom of the cup contains a watery fluid in which the insects drown. Acid and enzymes then break down the insects' bodies into compounds that can be absorbed as food by the leaf; see CARNIVOROUS PLANTS.

NEPHRITE. See JADE.

NEPHRITIS, general term for inflammatory diseases of the kidney. There are many types of nephritis but the most common form is glomerulonephritis, to which the term "nephritis" usually alludes. The condition was first described by the British physician Richard Bright (1789-1858) and is therefore also known as Bright's disease. Glomerulonephritis may be

acute or chronic. In the United States nephritis ranks high among the diseases that are a direct cause of death. It ranks high also as a contributory cause in such conditions as arteriosclerosis, hypertension, and heart failure. Patients with acute nephritis generally recover, particularly children. A small percentage of cases result in chronic nephritis, which tends to be a slowly progressive disease that gradually destroys the kidney.

Patients with acute nephritis often have a history of a streptococcal infection such as a strep throat a few weeks before the onset of nephritis; see BACTERIA: *Scientific Classification*. The disease is characterized by fatigue, loss of appetite, puffiness about the face, abdominal or flank discomfort or pain, and scanty, smoky-appearing, dark urine. There is no specific treatment; the vast majority recovers spontaneously, however, with rest and supportive measures.

Chronic nephritis usually presents no symptoms, but the urine will be found to contain albumin and, on microscopic examination, red blood cells and elongate objects called casts. When there is an advanced degree of destruction of kidney tissue with grossly impaired kidney function, patients become ill. They may develop generalized swelling with massive amounts of albumin in the urine, a condition called the nephrotic syndrome. Eventually they develop high blood pressure and might die of kidney failure or heart failure.

Treatment was ineffective until, in recent years, techniques were devised for removing poisons that accumulate in the blood of patients with kidney failure, such as the use of dialysis with the artificial kidney. Hope for the patient in the last stage of nephritis has also come with the improvement in techniques for kidney transplant.

See KIDNEY: *Diseases of the Kidney*. L.J.V.

NEPOMUK, Saint John of. See JOHN OF NEPOMUK, SAINT.

NEPTUNE, fourth largest of the planets in the solar system (q.v.); see PLANET. The mean distance of Neptune from the sun is about 2,797,000,000 mi.; its mean linear diameter is about 27,700 mi., or about $3\frac{1}{2}$ times that of the earth; its volume is about 72 times, its mass 17 times, and its mean density about $2\frac{1}{4}$ times that of water and 0.45 that of the earth. The albedo of the planet is high; 62 percent of the light falling upon it is reflected. The period of rotation is slightly less than 16 hr. and the period of revolution about the sun is 164.79 years. The average stellar magnitude (q.v.) of the planet is 8, and it is therefore never visible to the naked eye, but it

can be observed in a small telescope (q.v.) as a small, round, greenish-blue disk without definite surface markings. The temperature of the observable surface of Neptune is very low; it is estimated to be at least -200°C (-328°F). Spectrographic analysis indicates the presence of large amounts of methane in the atmosphere, and there are some indications that the bulk of the atmosphere of Neptune might be composed of hydrogen and helium (qq.v.); see **SPECTRUM: Spectrum Analysis**.

Neptune has two known satellites; the larger and brighter is Triton, discovered in 1846, the same year Neptune was first observed. Triton is about the size of the earth's moon, and is much larger than Nereid, the second satellite, which is also much fainter. Nereid has a diameter of only about 200 mi. and was discovered photographically in 1949. On the basis of findings in the mid-1950's, astronomers concluded that Pluto (q.v.), classified as a planet since its discovery in 1930, may have originally been a third satellite that broke away from Neptune millions of years ago.

The discovery of Neptune was one of the great triumphs of mathematical astronomy. In order to account for perturbations in the orbit of the planet Uranus (q.v.), the French astronomer Urbain Jean Joseph Leverrier (q.v.) predicted in 1846, purely on the basis of mathematical calculations, the existence and position of a new planet. The same year the German astronomer Johann Gottfried Galle (1812-1910) discovered the planet within 1 degree of that position. **NEPTUNE**, in Roman mythology, god of the sea, son of the god Saturn, and brother of Jupiter, king of the gods, and Pluto (qq.v.), god of the dead. Originally a god of springs and streams, he became identified with the Greek god of the sea Poseidon (q.v.). His chief festival, the Neptunalia, was celebrated on July 23.

NEPTUNIUM, transuranic, radioactive element with at.no. 93, at.wt. 237, m.p. 640°C (1184°F), sp.gr. 20.45, and symbol Np. Like the other elements heavier than uranium, neptunium has not been found in nature but is produced artificially. It was first discovered in 1940, by the American physicists Edwin Mattison McMillan (q.v.) and Philip H. Abelson (1913-). Neptunium was produced by bombardment of uranium-238 with neutrons; the resultant uranium-239 decays radioactively by emitting a beta particle to form neptunium-239. The neptunium isotope in turn emits a beta particle, forming the important isotope plutonium-239, one of the materials of which atomic bombs are made. Seven isotopes of neptunium are cur-

rently known. The most stable neptunium isotope, neptunium-237, which has a half-life (q.v.) of 2,250,000 years, was discovered by the American chemists Glenn Theodore Seaborg (q.v.) and Arthur Charles Wahl (1917-). This long-lived isotope served as a useful research tool in the atomic-bomb project during World War II. Neptunium is part of a second series of rare earths (q.v.), called the actinide series, which begins with the element actinium; the chemical properties of the element, which have been explored by microchemical techniques (see **MICROCHEMISTRY**), are similar to those of the rare earths. See **TRANSURANIUM ELEMENTS**.

NEREIDS, in Greek mythology, nymphs of the Mediterranean Sea. They were the fifty lovely daughters of Nereus (q.v.), the old man of the sea, and his wife Doris. They lived at the bottom of the sea, but often came to the surface to aid sailors and other travelers. They were believed to ride dolphins and other sea animals. The most famous of the Nereids were Thetis, the mother of the Greek hero Achilles; Amphitrite, the wife of Poseidon, god of the sea; and Galatea, who was loved by the Cyclops Polyphemus (qq.v.).

NEREUS, in Greek mythology, sea-god, son of the sea-god Pontus and Gaea (q.v.), the Earth, called the old man of the sea. He was married to Doris, a daughter of the Titan Oceanus (q.v.), by whom he had fifty beautiful daughters, the nymphs of the sea, called the Nereids (q.v.). Nereus lived at the bottom of the sea.

NERI, Saint Phillip. See **ORATORY, CONGREGATION OF THE**.

NERNST, Walther Hermann (1864-1941), German physical chemist, born in Briesen (now Wabrzezno, Poland), and educated at the universities of Zürich, Berlin, Graz, and Würzburg. After serving as professor at the University of Göttingen, he was appointed professor of physics at the University of Berlin in 1905 and later became director of the Institute of Experimental Physics in Charlottenburg (now part of West Berlin). In 1925 he was appointed director of the Physical Institute at the University of Berlin. Nernst developed an electric lamp, called the Nernst lamp, which was more efficient than the old carbon-arc lamps, but which became obsolete with the development of modern filament lamps; see **ELECTRIC LIGHTING**. He made outstanding contributions in chemical equilibria and in the theory of solutions, particularly on the diffusion, hydration, and dissociation of electrolytes, and made important measurements of specific heats of substances at low temperatures. He is best known for his enunciation of the third law

NERO

of thermodynamics, for which he received the 1920 Nobel Prize in chemistry. See THERMODYNAMICS

NERO (37–68 A.D.), Emperor of Rome (54–68 A.D.), last of the Caesars, the son of the Roman consul Gnaeus Domitius Ahenobarbus (d. about 40 A.D.) and Agrippina the Younger (see under AGRIPPINA), born in Antium, on the coast of Latium. In 49 A.D. Nero's mother married her uncle, Emperor Claudius (q.v.), who adopted him the following year, changing the boy's name, originally Lucius Domitius Ahenobarbus, to Nero Claudius Caesar Drusus Germanicus. In 53 A.D. Nero, at the age of sixteen, married Octavia (q.v.), the daughter of Claudius by his third wife Valeria Messalina (d. 48 A.D.), thus allying him-



Nero

self more closely with the imperial family. After the death of Claudius (54 A.D.), the Praetorian Guards, at the instigation of their prefect, Sextus Afranius Burrus (d. 62 A.D.), declared Nero emperor, instead of Claudius' son Britannicus (d. 55 A.D.), and their choice was accepted both by the Roman Senate and by the provinces.

In the opening years of his reign Nero displayed considerable ability and many good qualities. He was noted for his liberality and his clemency. Under the guidance of Burrus and of his tutor, the philosopher Marcus Annaeus Seneca (54 B.C.?–39 A.D.), Nero ruled with moderation, the first five years being considered a golden *quinquennium Neronis*. Nero had, however, caused the death by poison of Britannicus, Claudius' son, in 55 A.D., and by 59 A.D. his vanity, selfishness, and cruelty were apparent to all. In this year he caused his own mother Agrippina

to be murdered to please his mistress Poppaea Sabina (d. 65 A.D.). In order to marry Poppaea, Nero divorced and later had put to death his youthful and neglected wife Octavia.

The affairs of the empire at this time were in turmoil. In 61 A.D. an insurrection broke out in Britain among the Iceni under their queen Boadicea (q.v.), but the revolt was suppressed by the Roman governor Gaius Suetonius Paulinus. In the following year a Roman army fought a costly and unsuccessful war against the Parthians in Armenia. At home both the emperor and the senate were bitterly criticized. Burrus died, and Seneca retired to private life. In July, 64 A.D., two thirds of Rome burned completely. Nero was said to have admired the spectacle from a distance, reciting verses about the burning of Troy, and he was charged in ancient times with being the incendiary, but most modern scholars doubt that he was in any way responsible for the fire. To offset the charge, Nero laid the blame upon the Christians and persecuted them with fury. He rebuilt the city with great magnificence and constructed for himself a splendid palace, known as the Golden House, extending from the Palatine Hill to the slopes of the Esquiline Hill. To provide for this expenditure and for the gratification of the populace by spectacles and distributions of free grain, he plundered both Italy and the provinces.

A conspiracy of many distinguished persons was organized against Nero in 65 A.D., known usually as the Pisonian conspiracy, from Gaius Calpurnius Piso (d. 65 A.D.), one of the leaders. The conspiracy was discovered, and many prominent Romans fell victim to the emperor's vengeance, among them Seneca and his nephew, the epic poet Lucan (q.v.). In a fit of passion Nero kicked his wife Poppaea, who died of the injuries sustained. He then proposed marriage to Antonia (d. 66 A.D.), the daughter of Claudius, but was refused, whereupon he caused her to be put to death, and married Stilla Messalina after putting her husband to death. Nero's vanity led him to seek distinction as a poet, a philosopher, an actor, and a musician, and he received applause, not only in Italy, but also in Greece, which he visited in 67 A.D. The following year the Gallic and Spanish legions, and after them the Praetorian Guards, rose against him, and Nero fled from Rome. The senate declared him a public enemy, but he escaped execution by suicide. See ROME, HISTORY OF.

NERUDA, Pablo, pen name of NEFTALÍ RICARDO REYES Y BASOALTO (1904–73), Chilean poet and Nobel laureate, considered



Pablo Neruda in 1971.

UPI

one of the major poets of the 20th century.

Neruda was born July 12, 1904, in Parral, the son of a railroad worker. He began to write poetry in his teens and studied to be a teacher. In 1924 his book of poems, *Veinte Poemas de Amor y una Canción Desesperada* (Eng. trans., *Twenty Love Poems and a Song of Despair*, 1969), became a best-seller, making him one of Latin America's most famous young poets. Neruda's numerous other works include *Residencia en la Tierra* (1933; Eng. trans., *Residence on Earth*, 1946), poems full of tragic, despairing images of the havoc wreaked on earth by civilization, and *Canto General* (1950; "General Song"), an epic poem portraying Spanish America and its history from a Marxist viewpoint. *Selected Poems of Pablo Neruda* (1961) contains a representative collection of his poems in the original Spanish, with English translations. A highly imaginative poet, Neruda began as a symbolist, then became a surrealist and finally a realist, forsaking the traditional, formal framework of poetry for a simpler, more down-to-earth form of expression. His influence on the poetry of the Spanish-speaking peoples has been great.

In recognition of his literary eminence Neruda was appointed to the Chilean consular service, and from 1927 to 1944 he held posts in the Far East, Latin America, and Spain. A political radical, he became prominent in the Chilean Communist Party, serving in the Senate from 1945 to 1948. In 1970 he was named the party's candidate for the presidency, and from 1970 to 1973 he was the Chilean ambassador to France. In 1971 he was awarded the Nobel Prize for literature and the Lenin Peace Prize. He died Sept. 23, 1973, in Santiago.

NERVA, Marcus Cocceius (about 35-98 A.D.), Roman Emperor (96-98 A.D.), born in Narnia,

NERVOUS SYSTEM

Umbria, to parents of senatorial rank. He was twice consul, in 71 A.D. with the emperor Vespasian (q.v.) as colleague, and in 90 A.D. with the emperor Domitian (q.v.) as colleague. When Domitian was assassinated in 96 A.D., Nerva was elected emperor by the senate, reflecting the choice both of the people and of the soldiers. As an emperor Nerva displayed great wisdom and moderation; he became known as the first of the so-called "good emperors". The activities of the informers who had flourished under Domitian were checked. Nerva chose senators as his councilors and allowed the senate to perform its traditional functions. He attempted to reduce the costs of the government. Being interested in the economic welfare of his country, he had the senate pass an agrarian law which provided for the purchase of land for poor citizens. Even more effective was his legislation to maintain the children of poor parents in the towns of Italy at public expense. Because of his advanced age and feeble health, Nerva was not vigorous enough to repress the demands of the Praetorian Guard (q.v.), who had favored his predecessor and insisted on the execution of the assassins of Domitian, retained in office by Nerva. Wishing to place the government in strong hands, Nerva adopted as his son and successor Marcus Ulpius Trajanus, usually known as Trajan (q.v.), who was then in command of the Roman legions on the Rhine R. Nerva ruled for three months with Trajan, who then succeeded him.

NERVE GAS. See GAS WARFARE.

NERVI, Pier Luigi (1891-1979), Italian engineer and architect, born in Sondrio, and educated at the University of Bologna. He worked (1913-15; 1919-32) as a designer and engineer at Bologna, Florence, and Rome; served (1915-19) as an engineering officer in World War I; taught (1947-61) at the University of Rome; and became (1932) a director of the Rome engineering firm of Nervi and Bartolli.

From the early 1930's, when his designs began to attract international attention, Nervi showed his remarkable talents as engineer and architect, mechanic and artist. His invention in the 1940's of *ferro-cemento*, layers of soft steel mesh impregnated with cement mortar, enabled him to construct the tilted arches, curved ceilings, and bold cantilevered stairways that distinguish his designs. Among his notable works are the exhibition halls in Turin (1949; 1950), three stadiums for the Rome Olympic Games (1956-59), and the design for the Pitt-Rivers Museum at the University of Oxford (1969).

NERVOUS SYSTEM, those elements, such as muscles or glands, within the animal organism

NERVOUS SYSTEM

concerned with the reception of stimuli, the transmission of nerve impulses, or the activation of motor mechanisms, together with supporting cells.

Anatomy and Function. The reception of stimuli may be the function of special sensory cells or a specialized connective tissue may be arranged around a free nerve fiber, making it possible for it to be activated. The conducting elements of the nervous system may be unspecialized cells, capable of only slow and generalized activity, or they may be highly efficient and rapidly conducting units called neurons. The specific response of the neuron, the nerve impulse, and the capacity of the cell to be stimulated make this cell a receiving and transmitting unit capable of transferring information from one part of the body to another. Each nerve cell consists of a central portion containing the nucleus known as the cell body and one or more structures referred to as axons and dendrites. Ordinarily, the dendrites are rather short extensions of the cell body and are involved in the reception of stimuli. The axon, by contrast, is usually a single elongated extension especially important in the transmission of nerve impulses from the region of the cell body to other cells. Either the axons or the dendrites may be greatly elongated, allowing nerve impulses to be transmitted for considerable distances.

Although all many-celled animals have some type of nervous system, the complexity of its organization varies considerably among different animal types. In such simple animals as jellyfish, the nerve cells form a network capable of mediating only a relatively stereotyped response. In more complex animals, such as shellfish, insects, and spiders, the nervous system is more complicated. The cell bodies of neurons are organized in clusters called ganglia. These clusters, in lower animals, are interconnected by the neuronal processes to form a ganglionated chain. Such chains are found also in all vertebrates (q.v.), in which they represent a special part of the nervous system known as the sympathetic nervous system. This special part is related especially to the regulation of the activities of the heart, the glands, and the involuntary muscles.

Vertebrate animals have a bony spine and skull in which the central part of the nervous system is housed; the peripheral part extends throughout the remainder of the body. That part of the nervous system located in the skull is referred to as the brain (q.v.); that found in the spine is called the spinal cord (q.v.). The brain and the spinal cord are continuous through an opening in the base of the skull; both are also in

contact with other parts of the body through the nerves. It is important to emphasize that the distinction between the central nervous system and the peripheral nervous system is one of convenience based on the different locations of two intimately related parts of a single system. Some of the processes of the cell bodies situated in the central nervous system extend through the peripheral nervous system and not only conduct sense impressions, but they also conduct simple motor responses called reflexes, such as those caused by pain; see REFLEX. In the skin are cells of several types called receptors; each is especially sensitive to particular stimuli. In this case, free nerve endings are sensitive to pain and are directly activated. The neurons so activated send processes into the central nervous system and have junctions with other cells that have axons extending back into the periphery. Impulses are carried from processes of these cells to motor endings within the muscles; see MUSCLE. These neuromuscular endings excite the muscles, resulting in muscular contraction and the appropriate movement. The pathway taken by the nerve impulses in mediating this response is in the form of a two-neuron arc that begins and ends in the periphery. It is possible to explain many of the actions of the nervous system on the basis of such simple reflex arcs, which are simply chains of interconnected nerve cells, easily stimulated at one end and capable of bringing about movement or glandular secretion at the other.

The nerves that connect to the brain pass through openings in the skull, or cranium, and are known as cranial nerves. Those associated with the spinal cord pass through openings in the vertebral column and are called spinal nerves. Both cranial and spinal nerves consist of large numbers of processes that both convey impulses to the central nervous system and carry messages outward; the former are called afferent, the latter are designated efferent. Afferent impulses that reach the level of consciousness are referred to as sensory; efferent impulses may be either somatic or visceral motor. A mixed nerve is made up of both sensory and motor elements. The cranial and spinal nerves are paired; the actual number of paired nerves varies in different vertebrates. Mammals possess twelve pairs of cranial nerves and approximately thirty pairs of spinal nerves; the number in man are 12 and 31, respectively. Cranial nerves are distributed to the head and neck regions of the body, with one conspicuous exception: the tenth cranial nerve, called the vagus. In addition to supplying structures in the neck, the vagus is

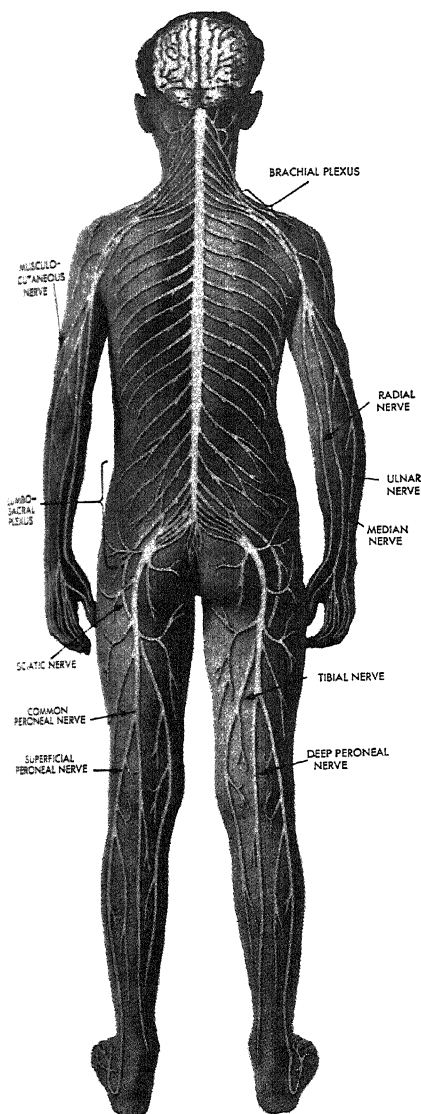


Diagram of the nervous system of the human body, including the brain and the spinal cord.

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distributed to structures located in the chest and abdomen. Vision, audition, vestibular sensation, and taste are mediated by the second, seventh, and eighth cranial nerves. Cranial nerves also mediate motor functions of the

head, the eyes, the face, the tongue, and the larynx, as well as the muscles that function in chewing and swallowing. Although spinal nerves tend to be distributed in a bandlike fashion in the regions exterior to their exit from the spine, the spinal nerves related to the limbs interconnect extensively in their peripheral course, thereby forming both the brachial plexus which runs to the upper extremity, and the lumbar plexus, which passes to the lower limbs.

Each nerve is made up of a number of neuronal processes bound together by connective tissue and supplied by blood. The individual nerve fibers are either sensory or motor. Among the motor fibers may be found groups that carry impulses to the muscles attached to the skeleton, and others that are part of a system of nerve cells related to visceral activities. The latter fibers are designated by the special name or autonomic nervous system (q.v.). That system consists of two divisions, more or less antagonistic in function, that emerge from the central nervous system at different points of origin. One division, the sympathetic, arises from the middle portion of the spinal cord, courses through the spinal nerves, and is widely distributed throughout the body by joining the sympathetic ganglionated chain. The other division, the parasympathetic, arises both above and below the sympathetic, that is, from the brain and from the lower part of the spinal cord. These two divisions control the functions of the respiratory, circulatory, digestive, and urogenital systems.

Disorders of the Nervous System. Consideration of disorders of the nervous system is the province of neurology; psychiatry (q.v.) deals with behavioral disturbances of a functional nature. The division between these two medical specialties cannot be sharply defined, however, for neurological disorders often manifest both organic and mental symptoms; for a discussion of functional mental illness, see BRAIN; MENTAL DISORDERS.

Diseases of the nervous system include malformations, genetic defects, poisonings, metabolic defects, infections, inflammations, degeneration, and tumors and involve either nerve cells or their supporting elements. The nervous system may also be affected by such vascular disorders as cerebral hemorrhage or apoplexy, which may result in paralysis and other neurological complications; see STROKE. The advanced stage of syphilis (q.v.) affects the nervous system, and the type of chorea that stems from rheumatic fever (q.v.) is a neurological disorder; see SAINT VITUS'S DANCE.

The nervous system is subject to infection by a great variety of bacteria, parasites, and viruses. For example, meningitis (q.v.) infection of the meninges investing the brain and spinal cord, can be caused by many different agents. On the other hand, one specific virus causes rabies; see **HYDROPHOBIA**. Some viruses causing neurological ills affect certain parts of the nervous system more than others. For example, the virus causing poliomyelitis (q.v.) commonly affects the spinal cord; that causing encephalitis (q.v.) usually attacks the brain.

Inflammations of the nervous system are named according to the part affected. Myelitis is an inflammation of the spinal cord; neuritis (q.v.) is an inflammationlike reaction of a nerve. It may be caused, not only by infection, but also by poisoning, alcoholism, or injury.

Some diseases exhibit peculiar geographic and age distributions. In temperate zones, multiple sclerosis (q.v.) is a common degenerative disease of the nervous system of middle age, but it is rare in the tropics and South Africa. Arteriosclerosis is a chronologically related disease that may affect the nervous system as a result of degeneration of the arteries in the brain; see **ARTERY: Diseases of the Arteries**. Various other degenerative processes occur in the nervous system itself.

Tumors originating in the nervous system usually are composed of meningeal tissue or neuroglia cells, depending upon the specific part of the nervous system affected, but other types of tumor (q.v.) may metastasize to or invade the nervous system; see **CANCER**. In certain disorders of the nervous system, such as neuralgia, migraine, and epilepsy (qq.v.), there may be no evidence of organic damage. Another disorder, cerebral palsy (q.v.), may be associated with birth defects (q.v.).

P.J.H. & F.A.M.

NESS, LOCH, long, narrow lake of Scotland, in Inverness County, forming part of the Caledonian Canal. It extends in a N.E. direction for about 24 mi. from Fort Augustus to a point 6 miles S.W. of the city of Inverness. The average width of the lake is 1 mi. and the greatest depth is 754 ft. It is drained by the Ness R. into Moray Firth (q.v.). The lake is reportedly the home of a monster, the existence of which has not been authenticated.

NESSUS. See **HERCULES**.

NEST BUILDING, or **NIDIFICATION**, construction by an animal of a comfortable and safe receptacle in which to lay its eggs or give birth to its young, and in which to rear the young until they are able to fend for themselves. Among the most familiar nests are the woven and ce-

mented structures built from twigs, grass, feathers, and other materials by birds; such nests are usually characteristic of certain genera or families of birds. Nests built almost entirely of salivary secretions are characteristic of the swifts (see **SWIFT**) and form the basis for Oriental bird's-nest soup. Many birds, however, do not build nests of their own, but lay their eggs and rear their young in structures abandoned by other birds, or in convenient holes and depressions fashioned by nature or man. Almost as familiar as the nests of birds are the paper-thin nests of wasps, the hives of bees, and the hills of ants, in which these social insects raise their young. Many cyclostomes and fishes construct nests of saliva or stones in which to lay their eggs; see **GOURAMI**; **LAMPREY**. Among mammals, the rodents commonly engage in nest-building, constructing soft beds of scraps of rag, twigs, paper, or grass for their young. Many of the higher mammals provide some form of bed for their young. See also **BIRD: Nest Building**.

NESTOR, in Greek mythology, King of Pylos, son of Neleus and Chloris. In his early life, Nestor was a distinguished warrior and participant in many of the great events of the day. He took part in the fight of the Lapithae against the centaurs (q.v.), was among the Calydonian boar hunters (see **MELEAGER**), and sailed with the Argonauts (q.v.) in quest of the Golden Fleece (q.v.). Although well advanced in years when the Trojan War (q.v.) began, he sailed with the other Greek heroes against Troy. Having ruled over three generations, he was renowned for his wisdom and justice, and he served as wise counselor to the Greeks during the war. After the fall of Troy, Nestor returned safely home to Pylos, and welcomed Telemachus (q.v.) when the youth came for information about the fate of his father Odysseus (see **ULYSSES**).

NESTORIANS, in ecclesiastical history, adherents of Nestorius (d. about 451 A.D.), patriarch of Constantinople (now Istanbul, Turkey) from 428 to 431. Nestorius preached a variant of the orthodox doctrine concerning the nature of Jesus Christ (q.v.); see **CHRISTOLOGY**. The orthodox doctrine is that Christ has two natures, one divine and one human, which although distinct are joined in one Person and Substance; Nestorius claimed that in Christ a divine and a human Person acted as one, but did not join to compose the unity of a single individual. Also, according to Nestorius, the Virgin Mary (see **MARY**) could not be called "Mother of God", as she was termed by more orthodox Christians, because her Son, Jesus, was born as a man, His divine nature being derived not from her but

from the Father who begot him. The doctrines of Nestorius spread throughout the Byzantine Empire (q.v.) during the early 5th century and caused much argument.

Finally, in 431 the Council of Ephesus declared the Nestorian beliefs to be a heresy (q.v.), deposed Nestorius and drove him out of the empire, and persecuted his followers; see *EPHESUS*; *COUNCILS OF*. The Nestorians sought refuge in Persia, India, China, and Mongolia. In early medieval times the Nestorian Church was powerful in those countries, but it was greatly reduced by later persecutions, and at the present time the Nestorian (or East Syrian) Church includes fewer than 100,000 people, located mainly in Iran, Kurdistan, and Malabar, India. A monument consisting of a stone table 7½ ft. high and 3 ft. wide was put up by Chinese Nestorians at Changan (now Sian) in 781. Its inscription, partially in Syriac, comprises the only extant record of Nestorianism in China; see *SYRIAC LANGUAGE AND LITERATURE*. The monument was excavated in 1625; a reproduction of it is in the Metropolitan Museum of Art, New York City.

See also *CHRISTIANITY: Basic Doctrines*; *MONARCHIANISM*; *MONOPHYSITES*; *MONOTHELITES*; *TRINITY*. **NETANYA**, city of Israel, in the Central District, at the edge of the Plain of Sharon, on the Mediterranean Sea, 18 miles N.E. of Tel Aviv-Haifa. The city is a junction on the coastal road, and the railroad runs along its inland edge. An industrial zone has been established, and textile-milling, food-processing, and bottling industries are supplemented by the production of chemicals, pharmaceuticals, rubber and plastic products, wine, and paper products. The most famous industry of the city, however, is that of diamond cutting and polishing, established by Belgian immigrants just before and during World War II. A beach and health resort, the city has extensive gardens that overlook the sea. It is the site of the Goldmunz Art Museum. Netanya was founded in 1929 by Zionist settlers. Pop. (1971 est.) 62,500.

NETHERLANDS ANTILLES (Du. *De Nederlandse Antillen*), integral part of the Netherlands, situated in the West Indies, and comprising two island groups, the Netherlands Windward and the Netherlands Leeward islands. The former group, consisting of Curaçao, Bonaire, and Aruba (qq.v.), is situated in the Lesser Antilles about 250 miles N.E. of Caracas, Venezuela, and lies between approximately lat. 12° N. and lat. 12°35' N. and long. 66°14' W. and long. 70°15' W. The area of the Netherlands Windward Islands is 361 sq.mi.; population (1971 est.) 228,246. The Netherlands Leeward

Islands consist of the southern third of Saint Martin and all of Saint Eustatius and Saba, covering a total area of about 26 sq.mi.; population (1967) 7424. These islands are situated within the Leeward Island group, to the S.W. of Puerto Rico, and lie approximately between lat. 17°50' N. and long. 63° W.

The only important industry is the refining of petroleum imported from Venezuela; Aruba has the largest oil refinery in the world. In the late 1960's, petroleum and petroleum products accounted for \$572,000,000 of the total annual export value of \$595,000,000. Imports were valued at \$653,000,000 annually. Phosphate of lime (calcium phosphate) and pumice deposits were being developed in the late 1960's, and tourism was making important gains. Bonaire and the Leeward group have little economic importance. Much of the food supply of Curaçao and Aruba is imported from Venezuela.

Willemstad, on the island of Curaçao, is the seat of the government. Executive power is exercised by a governor, who is an appointee of the Dutch government, and the council of ministers. Legislative authority is vested in the *Staten*, which is composed of twenty-two popularly elected members. Defense and foreign affairs are the responsibility of the crown. Dutch is the official language. In addition, the natives speak English, Spanish, and Papiamentu, a jargon made up of Dutch, English, Spanish, Portuguese, various African dialects, and some Indian (Carib) words. The two island groups, once known as the Dutch West Indies, formed a colony of the Netherlands until 1922, when they were made an integral part of the country. The name Netherlands Antilles was adopted in 1948. **NETHERLANDS INDIES** or **NETHERLANDS EAST INDIES** or **DUTCH EAST INDIES**, designations of the former possessions of the Netherlands in the Malay Archipelago (q.v.). In physical geography the islands are S.E. of Asia and N. and N.W. of Australia, and lying E. and W. of the Indian and Pacific oceans, respectively. Officially called the Netherlands Overseas Territories in Asia, it included the islands of Celebes, Java, Sumatra, most of Borneo, the W. part of New Guinea (qq.v.), and numerous smaller islands. Except for New Guinea, the Netherlands Indies became the independent Republic of Indonesia in 1950. The area of Netherlands Indies was 735,006 sq.mi.

Details of the physiography, climate, plants and animals, population, economy, and history of the large islands named above will be found in the articles on those islands; see also *BAU*; *BANGKA*; *BELITUNG*; *BURU*; *CERAM*; *FLORES*; *MOLUC*.

NETHERLANDS INDIES

CAS; SUMBA ISLAND; SUMBAWA; SUNDA ISLES; TIMOR. A description of the present-day economy and government structure of the islands as a whole is contained in the article Republic of Indonesia; see INDONESIA, REPUBLIC OF. For a related history of the islands the reader is referred to NETHERLANDS: *History*.

History. Settlement and conquest of the Malay Archipelago by Europeans began in the early 16th century with the arrival of Portuguese explorers; Dutch and English traders followed in the late 16th and early 17th centuries. As rivalry for a trade monopoly increased, the Dutch East India Company (see EAST INDIA COMPANY: *Dutch East India Company*), formed in 1602, ousted the Portuguese from all but Timor Island, and, after a series of conflicts with the English, emerged the dominant power in the area. The spice trade was completely controlled by the Dutch company, and revolts by the Indonesians against abusive treatment were severely repressed. Fortunes were accumulated by Dutch investors and traders until the late 18th century when the company went bankrupt as much of its funds were used for military operations to preserve its position. With the dissolution of the Dutch East India Company in 1798 the Dutch government, after 1816, ruled the possessions directly. For the greater part of the 19th century the government was occupied with extending Dutch dominion and with the development of the agricultural economy of the islands. As the spice trade diminished in importance, the government concentrated on such export crops as coffee and sugar, and in 1830 the culture system was introduced. This system demanded that Indonesian farmers devote part of their land to the cultivation of export crops. In many cases the system resulted in the neglect of subsistence crops and periods of famine. As the Dutch discovered and exploited the mineral resources of the islands, notably oil and tin, they extended their control, and by 1907 ruled all of present-day Indonesia.

The intensive exploitation of the Indonesians by the Dutch was a continuing cause of political unrest, engendering sporadic uprisings, which were suppressed. Pressure by the Indonesians for political freedom became particularly intense after World War I, and as a result in 1918 the Dutch established an advisory body, or Volksraad, which included some Indonesians, to assist the governor-general of the Netherlands Indies, appointed by the Dutch crown. Not satisfied with the limited power the council afforded them, the Indonesians continued their struggle for social equality, economic independence, and political freedom. The 1920's

were marked by strikes and revolts against the government, and by harsh retaliations by the Dutch. In 1942, during World War II, the Japanese occupied the islands. In 1945, as Japanese power began to crumble under the blows struck by the United States, the Indonesian nationalist revolutionary forces seized a favorable opportunity to assert the independence of Indonesia. **NETHERLANDS, THE** (Du. *Koninkrijk der Nederlanden*), constitutional monarchy of Europe, also known popularly but unofficially as Holland, situated in the n.w. region of the continental mainland. It forms with Belgium and Luxembourg what are known as the Low Countries. The Netherlands is bounded on the n. and w. by the North Sea, on the e. by West Germany, and on the s. by Belgium. The country lies between about lat. 50°44' N. and lat. 53°26' N. and long. 3°22' E. and long. 7°12' E. The land area is about 12,883 sq.mi.

Territories and Possessions. The overseas units of the kingdom are Surinam (q.v., formerly Netherlands Guiana) and the Netherlands Antilles (q.v., including the islands of Curaçao, Aruba, Bonaire, Saint Eustatius, and Saba, and a part of Saint Martin). These areas are now equal partners in the kingdom, with their own governments and parliaments constituted on the basis of general elections. Foreign affairs and defense are the responsibility of the kingdom.

THE LAND

The greatest length of the country, from the southern tip to the northernmost offshore island, is about 190 mi., and the greatest width, from e. to w., is about 105 mi. Physiographically the Netherlands comprises the western extremity of the North German Plain. With the adjoining coastal region of Belgium, the Netherlands is the least elevated part of Europe. The maximum elevation, attained in the hills of the s.e. province of Limburg, is about 1050 ft. above sea level. Elsewhere in the eastern part of the Netherlands, the highest elevation is several hundred feet. The average elevation of the entire country, however, is only slightly more than 30 ft. About 13 percent of the area of the Netherlands lies between sea level and 3 ft. above the sea, and more than 25 percent lies below sea level. This predominantly flat landscape offers no swift-running rivers as a source of hydroelectric power.

The principal coastal feature is the deep indentation in the n. formed by the former Zuider Zee when the North Sea penetrated about 80 mi. inland in the early 13th century. Realization of the vast reclamation projects under way since 1923 will reduce this gulf to a large inland

NETHERLANDS, THE

lake; see RECLAMATION. The greater part of the former Zuider Zee is now the IJsselmeer, a freshwater lake which is enclosed by an enormous dike, the Afsluitdijk. Another striking coastal feature is the area of sand dunes in the w. Formed by the wind and the sea over many centuries, they extend southward about 70 mi. from the entrance to the former Zuider Zee. These sandy hills attain a height of 100 to 180 ft. and serve as a natural barrier against incursions by the sea.

South of the sand dunes and comprising the extreme s.w. part of the country is the delta area created by the wide estuaries of the Scheldt (Schelde, q.v.) and Maas (Meuse, q.v.) rivers. In the delta are a number of relatively large islands, including Walcheren (q.v.), North Beveland and South Beveland (see BEVELAND, NORTH AND SOUTH), Schouwen, and Goeree.

From the northern extremity of the w. coast, the West Frisian Islands, (see FRISIAN ISLANDS) of the Netherlands extend in a n.e. direction in the North Sea, forming an irregular arc parallel to the n. coast. A large bay in the n. coast, Lauwers Zee, and a smaller gulf at the mouth of the Ems R., between the Netherlands and Germany, were also formed by catastrophic inundations in past centuries.

On the lee side of the sand dunes are many low-lying, fertile meadows. Some of these are in

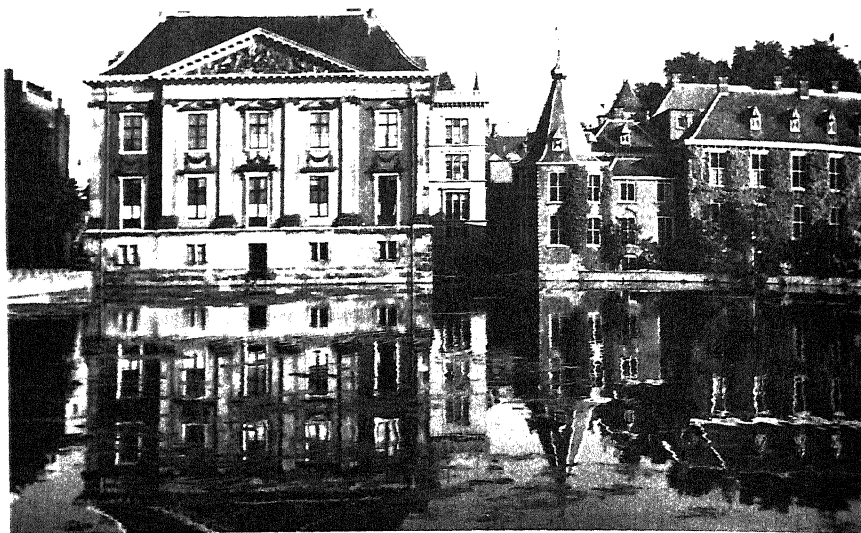
tracts of land reclaimed from the sea and known as polders. They are protected against inundation by a multitude of dikes and dams, some of them 60 ft. high. On the principal dikes are roads and canals which comprise an important part of the communications system of the country. Because the polders are too low for natural drainage, they are drained by a vast system of engineering works. In former times the motor power for the drainage system was supplied entirely by windmills, but presently such power is supplied by hundreds of diesel, electric, and steam pumps.

Large rivers are found only in the southern part of the country. These rivers flow in the direction of the general slope of the land, from e. to w., and are important in the commerce not only of the Netherlands but also of western Europe. The Rhine River (q.v.) is the great highway from western Germany to the sea. Entering the Netherlands near the town of Millingen, it divides into two principal arms. The southern and main arm, called the Waal R., merges with the Maas R. The northern arm, called the Lek R., flows past Rotterdam and empties into the

Amsterdam has been called the "Venice of the North", but the quiet beauty of its canals, narrow gabled houses, and tree-lined streets gives the city its own special atmosphere. Below, both boat and bicycle rest, stilled by winter.

Netherlands Information Service





The Mauritshuis, in The Hague. Originally a 17th-century residence, the building is today a museum of art.
 Netherlands Information Service

North Sea at the Hoek van Holland (Hook of Holland). From the Lek, a subsidiary stream, the Kromme Rijn (Crooked Rhine), winds northward, past Utrecht, and empties in the IJsselmeer. Another branch, the Old Rhine, flows westward from Utrecht to empty into the North Sea at Katwijk aan Zee. The IJssel and Vechte rivers also enter the Netherlands from Germany and empty into the IJsselmeer. The Maas enters the Netherlands from Belgium in the extreme southeastern part of the country. It flows first in a general northerly direction, forming a part of the border with Belgium; near Cuijk, it turns westward and flows parallel to the Waal, with which it merges to empty into the North Sea. Of the Scheldt, which rises in France as the Escaut R., only the mouths lie in the Netherlands.

Land Reclamation. As a result of the ever-present need for agricultural land, much territory has been rescued from the waters. In the 17th, 18th, and 19th centuries tracts were reclaimed from the sea in the n. and s.w. parts of the country, and from inland lakes in North Holland and South Holland. Of the lakes that disappeared in South Holland, the largest was the Haarlemmermeer; which occupied 45,000 acres; the Dutch airport of Schiphol occupies a part of the former lake bottom.

In recent decades, reclamation efforts have turned to the more sandy, less fertile lands in the eastern and southern parts of the country and to the former Zuider Zee. In 1932 engineers completed the dike that created the IJsselmeer,

transforming most of the Zuider Zee from an open to a closed bay. As the work of reclamation proceeds in the IJsselmeer, the land area of the Netherlands increases. The first polder, the Wieringermeer, had been prepared in 1930; when pumped dry after the dike was completed; it yielded an area of 48,000 acres. Subsequently, in 1947 and 1957, two great polders with a combined area of 260,000 acres were pumped dry. Two additional, equally large polders were being reclaimed in the late 1960's.

Climate. The climate of the Netherlands is moist, with a relatively small temperature range. The summers and winters are temperate. The mean temperature is 49° F. in the spring and autumn, 64° F. in July and August, and 36° F. in January. Annual precipitation is about 30 in., rain falling on an average of about 204 days a year. Most days are misty and damp.

Natural Resources. The natural resources of the Netherlands are limited. Agricultural resources are relatively important, as are the fish that abound along the North Sea coast. Mineral deposits of commercial importance include coal, petroleum, natural gas, and salt.

Plants and Animals. Because land in the Netherlands is both scarce and fully exploited, areas of wild, natural vegetation are not extensive. Most of the trees are flowers and much of the heather, which forms a conspicuous feature of the landscape, have been planted by man. About 70 percent of the forest is coniferous, consisting mainly of pine. The deciduous portion includes oak stands and many small willow groves. Pine woods are found on sandy lands in the e. and s. Flowers are grown in profusion.

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Zandvoort	G.3	Hunze (river)	H.3	Rottumaroog (is.)	G.1	Willem's (canal)	G.6

Only rabbits remain of the once varied animal life, but birds of many species are plentiful.

Soils. The most fertile soils of the Netherlands are in the polders. In the E. and S. the soils are sandy, although loams occur along the streams and in the S. Limburg region in the S.E.

THE PEOPLE

The Dutch population is mainly of Teutonic origin, a large majority being descendants of the Batavi. In the N.E. the people are descended chiefly from the ancient Germanic tribe of the Frisii, and in the S.E. from the Flemings. The Netherlands has a mixed agricultural-industrial society.

Population. The population of the Netherlands (census 1971) was 13,045,785; the United Nations estimated (1973) 13,438,000. The overall population density is about 850 per sq.mi. (U.N. est. 1973), among the highest in Western Europe. About 11 percent lived in rural areas or in towns of fewer than 5000 inhabitants.

Political Divisions. The Netherlands is divided into eleven provinces: Drenthe, Friesland, Gelderland, Groningen, Limburg, North Brabant, North Holland, Overijssel, South Holland, Utrecht, and Zeeland.

Principal Cities. Amsterdam (pop., 1972 est., 807,742), the capital, is a seaport and the principal city. Rotterdam (670,060), the second-largest city, is the chief commercial port of the Netherlands and one of the largest in Europe. The Hague (525,368) is the administrative center of the Netherlands. Utrecht (274,974) is a manufacturing center, whose chief products include tobacco, woolen goods, and furniture. In addition, the Netherlands, in the early 1970's, had thirteen other cities with populations of more than 100,000.

Religion. The largest religious groups in the Netherlands are Protestants (about 40 percent of the population), Roman Catholics (40 percent), and Jews (0.15 percent). Most Protestants in the Netherlands are Calvinists, the largest Protestant sect being the Dutch Reformed Church. Roman Catholicism is especially strong in the s., and is the religion practiced by 90 percent of the population in North Brabant and 94 percent in Limburg. In the northern provinces of Groningen, Friesland, and Drenthe, not more than 7 percent of the population is Roman Catholic.

Language. The principal language of the Netherlands is Dutch, but Flemish and the Frisian dialect are also spoken. See DUTCH LANGUAGE; FLEMISH LANGUAGE AND LITERATURE; FRISIAN LANGUAGE AND LITERATURE.

Education. Since the establishment of a school in Utrecht about 695 A.D. by the English missionary Willibrord (q.v.), the Netherlands has been a center of educational activity on many different levels. In the Middle Ages it began to influence education in other countries. The scholarly order of The Brethren of the Common Life, founded in the 14th century, provided schools in which many intellectual leaders of Europe were taught. The Dutch scholar Desiderius Erasmus (q.v.), who had been educated by the order, taught in English universities, traveled throughout Europe, and wrote important works on education. Dutch educational influence became even more firmly established with the founding in 1575 of the University of Leiden, which became the leading European institution devoted to the teaching of science and other modern subjects.

In the 20th century the Netherlands received international recognition for a unique school

NETHERLANDS, THE

system under which parents may have their children educated at a school of their choice at public cost. The constitution of 1917 and the education act of 1920 established complete equality between public and religious schools.

School attendance between the ages of six and fifteen is compulsory. Private schools are about twice as numerous as public schools. The former are heavily subsidized by the national government and are of three major kinds: Roman Catholic, Protestant (the so-called Christian schools), and neutral, or nondenominational. The municipalities concerned also contribute funds for the public schools.

Illiteracy is virtually unknown in the Netherlands. Course requirements for all schools are uniform throughout the nation. The curricula are supervised by the ministry of education.

ELEMENTARY AND SECONDARY SCHOOLS. In the mid-1970's preprimary schools numbered about 7325 and were attended by about 513,600 children annually. Elementary schools numbered about 8500, and annual enrollment was about 1,448,200 pupils. In addition, special schools for backward children, tubercular children, children in poor health, and otherwise handicapped young people totaled about 870, with an annual enrollment of about 78,100. More than 3500 secondary schools, with general and vocational curricula, were attended annually by about 1,210,300 pupils; vocational studies included technical and agricultural subjects.

UNIVERSITIES AND COLLEGES. In the mid-1970's the fourteen institutions of higher learning in the Netherlands had an annual enrollment of more than 120,000 students. The public universities include the universities of Leiden (founded in 1575), Groningen (1614), Amsterdam (1632), Utrecht (1636), and Erasmus University at Rotterdam (1913; formerly the Netherlands School of Economics). Among the private institutions are the Free (Calvinist) University in Amsterdam (1880); the Roman Catholic University in Nijmegen (1923); the Roman Catholic School of Economics at Tilburg (1927); and technical colleges at Delft (1906), Eindhoven (1957), and Enschede (1964).

Culture. Until the Roman invasion in the 1st century A.D. the culture in the Netherlands was a mixture of Frisian and other Germanic strains, with Celtic influences from prehistoric times. At that time the Celtic culture of the northern Gauls became dominant in the lower Netherlands. Some Greek and Byzantine elements were infused in the 4th century, when the Franks (q.v.) conquered and Christianized the Netherlands.

Medieval culture comprised chiefly Teutonic and Christian elements. Monasteries were the strongholds of civilization and Latin culture, and great churches were built in the Romanesque and Gothic styles; see **GOthic ARCHITECTURE**; **ROMANESQUE ART AND ARCHITECTURE**.

The culture broadened in the 10th, 11th, and 12th centuries under foreign influences emanating from the Crusades (q.v.), and became secularized with the rise of cities from the 13th through the 15th centuries. In the 15th century the Burgundian court in the southern Netherlands completely absorbed and disseminated French culture throughout the region; see **BURGUNDY**. Important 16th-century movements included the Reformation, Calvinism, and Humanism (qq.v.), the latter much influenced by Erasmus. Nationalism also emerged in the 16th century, and the culture became more secular and realistic, with distinctively Dutch elements coming to the fore.

The 17th century was the cultural golden age of the Netherlands in the fine arts, the time of the poet Joost van den Vondel and the painters Rembrandt, Frans Hals, and Jan Vermeer (qq.v.). See **DUTCH LITERATURE**; **DUTCH PAINTING**; **FLEMISH LANGUAGE AND LITERATURE**. In the 18th century the courts of the stadtholders (governors of one or more provinces) were the cultural centers; there the traditional folk culture that had contributed so much to 17th-century flowering was repressed, and foreign influences, particularly French and Italian, were welcomed. Although Dutch culture did not introduce major innovations in the 19th century, the typical affluent bourgeois supported liberalism and the dissemination of the Dutch cultural heritage. A vigorous cultural life continued into the 20th century, when many modern European trends were absorbed.

Music. Music written in the area now referred to as the Netherlands has traditionally been treated as part of a larger body of music, written in what is now Belgium and parts of France as well as in the Netherlands proper. Early Dutch composers, however, include Jacob Obrecht (1452–1505) and Jan Pieterszoon Sweelinck (1562–1621). Both men were well known in other parts of Europe. Most of their music was intended for church use, although each wrote secular music as well; Sweelinck was a noted organist and teacher of organ in Amsterdam. Music in the Netherlands was dominated by composers of other European traditions during the 17th, 18th, and 19th centuries. In more modern times, however, distinctly Dutch composers have again come forward. Among them are Al-



Windmills in the Netherlands.

Netherlands Information Service

fons Diepenbrock (1862–1921) and Willem Pijper (1894–1947). Pijper was especially known as a teacher of modern composers, among them Henk Badings (1907–). Most recently, Peter Schat (1935–) and Ton de Leeuw (1926–) have become known for their work in advanced styles of composition.

The Concertgebouw Orchestra, founded in 1883, is an internationally renowned orchestra, with its home in Amsterdam. It was headed for more than twenty years by the Dutch conductor Eduard van Beinum (1901–59), who was succeeded by Bernard Haitink (1929–). The Nederlandse Operastichting, also in Amsterdam, is the country's leading opera company. Among contemporary singers of note was the baritone Anton Van Rooy (1870–1932), who sang many Wagnerian roles, and, more recently, the soprano Gré Gerarda Brouwenstyn.

LIBRARIES AND MUSEUMS. The Netherlands has many bookstores and public libraries, and the Dutch public reads extensively. Of the total population twelve years of age or older, more than 70 percent borrow books regularly from public libraries. Each university has a main library and many special libraries. The largest public library is the Royal Library in The Hague.

Of the country's more than 300 museums, about two thirds are in cities with populations under 100,000. Among the museums with world-famous works of art are the Rijksmuseum and

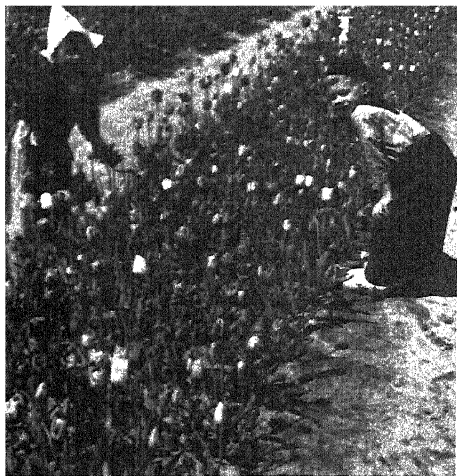
the Stedelijk Museum in Amsterdam, the Boymans-van Beuningen Museum in Rotterdam, and the Mauritshuis in The Hague.

THE ECONOMY

The Netherlands is primarily an industrial and secondarily a commercial nation. Out of a total working population of 4,688,000 in the mid-1970's, about 24 percent was engaged in manufacturing, 20 percent in commerce, 10 percent in construction, 7 percent in agriculture and fishing, and various percentages in other sectors. The Dutch economy is based on private enterprise, but centralized control plays a strong role. In a recent year, the national budget showed revenues of about \$30 billion and expenditures of more than \$35 billion.

Agriculture. In the Netherlands about 23 percent of the total land area is crop-cultivated, about 38 percent is grassland, and less than 1 percent is used for cultivation of bulbs, flowers, and nursery stock. The area of unused land is quite small, and much of it consists of unclaimable dune areas and sandy lands.

Because of the high population density, land cultivation is very intensive. By using modern agricultural techniques, Dutch farmers obtain some of the highest crop yields in the world. Even the poorer, sandy soils are well utilized. The principal agricultural activities are dairying,



For many people the tulip symbolizes Holland. Here, two children inspect the spring crop.

the raising of hogs and poultry, and the production of vegetables, fruit, flower bulbs, flowers, vegetable and flower seeds, shrubs, and trees. Approximate annual agricultural production in the mid-1970's included wheat, 528,000 metric tons; rye, 63,000 tons; barley, 336,000 tons; oats, 158,000 tons; potatoes, 5,003,000 tons; sugar beets, 5,927,000 tons. Livestock included about 4,956,000 cattle, 760,000 sheep, 7,279,000 pigs, 60,000 horses, and 62,000,000 fowls.

Forest and Fishing Industries. Only about 7 percent of the country is forested. Willow groves are cut for use in dike work and for the production of baskets and similar products. Total domestic wood production, however, is far below consumption needs, and 80 to 90 percent of the wood that is used is imported.

The fishing industry of the Netherlands is of only minor economic importance; it contributes little more than 2 percent to the gross national product and it employs about 1 percent of the working population. Most deep-sea fish are caught in the North Sea. The principal catch is herring, which is sold both fresh and salted. Trawlers catch haddock, cod, sole, and flounder. The principal fishing ports are IJmuiden, Vlaardingen, and Scheveningen.

Mining. Average annual production of the only commercially important minerals in the Netherlands in the mid-1970's included crude petroleum, 1,419,000 tons; salt, 2,690,000 tons; and natural gas, about 90 billion cubic meters (3,178,350,000 cu.ft.). The mining of coal was stopped completely on Jan. 1, 1975, by government order. Production of coal, once substantial, had declined to the point that Dutch mines were unable to compete in the international

market. The largest oil refinery in the world, at Aruba, in the Netherlands Antilles, is owned and operated by the Royal Dutch Petroleum Company, and the largest oil refinery in Europe is in Pernis, a suburb of Rotterdam. The output of petroleum is not great enough to meet the nation's needs, but a huge reserve of natural gas discovered in the 1960's now supplies nearly half the energy used in the Netherlands.

Power. Thermal plants produce most of the nation's electrical energy, which totaled about 54.26 billion kw hours per year in the mid-1970's.

Manufacturing. In the Netherlands the metal and machine, foodstuffs, textile, and chemical industries employ the largest numbers of workers. Most major industries are located in the provinces of South Holland, North Holland, Utrecht, Gelderland, Overijssel, and North Brabant. The annual production of crude steel in the Netherlands in the mid-1970's totaled about 4,800,000 tons. By-products of the iron and steel industry are used in factories that manufacture fertilizers, cement, and other items. Among the important foodstuffs produced are cocoa and chocolate, edible oils, oleomargarine, potato starch, butter, cheese, condensed milk, and powdered milk. Annual textile production in the mid-1970's included cotton yarn, 29,800 tons; woolen yarn, 11,300 tons; and rayon and acetate filaments, 27,800 tons. Among the products of the chemical industry are sulfuric acid, phosphate fertilizers, and such by-products of coke plants as ammonia, ammonium sulfate, and nitrogen fertilizers.

Other important manufactures are clothing, paper, wood products, cork, straw goods, earthenware, glass, leather, and rubber. The cutting and polishing of precious stones is also important. One of the largest electrical-products firms in Europe is located in Eindhoven. The Dutch tobacco industry always has been noted for its production of high-quality cigars, and in recent decades the production of cigarettes has increased greatly.

Currency and Banking. The unit of currency in the Netherlands is the guilder (Du. *gulden*) consisting of 100 cents, issued both as a silver coin and as paper (2.42 guilders equal U.S.\$1; 1977).

As a result of its widespread trade and commercial contacts, the Netherlands has long been important in international finance. From the 17th until the early 19th century Amsterdam was the financial capital of the world. It yielded this position to London during Napoleonic times, but remains today one of the leading financial

centers of Western Europe. The Netherlands Bank, which is the nation's central bank and sole bank of issue, is situated in Amsterdam, as are the head offices of about fifty other Dutch banks and branch offices of many foreign banks. The city is also the site of one of the major European stock exchanges.

Important banking functions, especially for small depositors, are performed by the postal service, which maintains a savings bank with more than 2000 offices. The Netherlands has about 275 other savings banks. It also has banks that specialize in loans to small businesses and to workers, and its farmers' credit banks fulfill a particularly important function.

Commerce and Trade. Limited natural resources and the central geographic location of the Netherlands have led to an unusual dependence on trade. Most of the foreign trade has been conducted with neighboring countries, notably West Germany, Belgium, Luxembourg, Great Britain, and France. The Netherlands, Belgium, and Luxembourg, the three members of the Benelux Economic Union (q.v.), each exempts the goods of the other two from import duties. Other important trade partners include West Germany, France, Great Britain, Italy, and the United States. Trade with Indonesia was sharply curtailed during the late 1950's by the seizure of Dutch properties in Indonesia. The chief centers for commerce and trade, in order of importance, are Amsterdam, Rotterdam, and The Hague.

Imports in the mid-1970's totaled about \$34.57 billion, and exports about \$35.08 billion. The principal imports were machinery, crude petroleum, transport equipment, and chemicals, but the country also had to import large quantities of basic food products, including wheat, fruits, and vegetables, although the value of agricultural exports usually slightly exceeded that of agricultural imports. The livestock and dairy industries have required the importation of large quantities of general and special feeds. In addition, the Netherlands, having few deposits of metallic minerals, has had to import most of the minerals and metals that are needed by its industries.

The chief exports include chemicals, machinery, petroleum products, meat and meat products, textile yarns and fabrics, transport equipment, dairy products and eggs, natural gas, and crude petroleum. In addition to meat and dairy products, agricultural exports also include vegetables. The intensive and remunerative types of agriculture practiced in the Netherlands depend upon easily accessible markets and upon a trade

unhampered by high protective tariffs and other restrictive measures.

Transportation. Rotterdam, with the adjacent cities of Delfshaven, Schiedam, and Vlaardingen, is the largest and busiest port in the world, outranking both New York City and London. The port of Amsterdam is commodious and is connected with the North Sea by the Noordzee Canal, which has some of the largest locks in the world. The transit trade of Amsterdam has increased in importance, partly as a result of a new major canal that connects the port with the Waal R. at Tiel. In the mid-1970's, the Netherlands had about 7900 inland vessels and about 700 oceangoing vessels, including those registered in the Netherlands Antilles.

The canals of the Netherlands are a unique feature of its transportation system. The nation has about 3000 mi. of navigable rivers and canals. Canals are important not only in the low-lying western and northern parts of the country, where they sometimes are built on the larger dikes, but also in the more elevated eastern and southern regions. Important canals in the E. include several that connect industrial towns with the IJssel R. A major waterway in the S.E. is the Juliana Canal in Limburg.

The Netherlands has 32,000 mi. of surfaced intercity roads, including modern multiple-lane highways for fast automotive traffic. Total railroad mileage is about 1750, of which more than 60 percent is electrified.

Air transport in the Netherlands centers in Schiphol, near Amsterdam, which is one of the major airports of Western Europe. Royal Dutch Airlines (KLM) provides air service to all parts of the world.

Communications. Telecommunications services are managed by the government. In the mid-1970's, citizens of the Netherlands had over 3,800,000 radios and 3,500,000 television sets. Telephones totaled more than 5,000,000, and practically any point in the Netherlands could be reached by dial telephone.

About 72 daily newspapers were being published in the mid-1970's. Daily circulation was in excess of 4,100,000. Complete freedom of the press prevails.

Labor. The total membership of Dutch labor organizations in the mid-1970's was more than 1,600,000, of which nearly one fourth represented government employees. Most labor unions have a specific religious, economic, or political orientation. The largest unions in the mid-1970's were the Nederlands Verbond van Vakverenigingen (Netherlands Federation of Trade Unions), with more than 660,000 members, and

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the Nederlands Katholiek Vakverbond (Catholic Trade Union Federation), with about 400,000 members.

GOVERNMENT

The Netherlands is a constitutional hereditary monarchy. Its constitution, which was promulgated in 1814, has been revised many times. It provides for a bicameral parliament (the States General), the lower house of which is elected by universal suffrage. All Dutch citizens over twenty-one years of age residing in the Netherlands are eligible to vote, and voting is obligatory in national elections.

Central Government. By the terms of the constitution of the Netherlands, the central executive power is vested in the crown, which includes the sovereign and the council of ministers. Through democratic evolution the functions of the sovereign have been largely reduced to ceremonial ones, but the monarch retains some political influence because of the traditional esteem in which the house of Orange is held. In addition, under the multiparty political system of the Netherlands, which makes it difficult to obtain a parliamentary majority, the sovereign may influence the choice of ministers by virtue of his or her right to name the prime minister. The council of ministers (cabinet), headed by the prime minister, formulates and carries out government policies and can initiate legislation. The ministers each head administrative departments and are responsible to the States General. A council of state, composed of members of the royal family and persons appointed by the sovereign, serves in an advisory capacity to the crown.

HEALTH AND WELFARE. The individual bears most of the cost of health care, but insurance against illness and accident is compulsory. Medical treatment is given on a private basis. Compulsory social insurance covers unemployment and disability. Both the health services and the administration of the widespread social-insurance system are decentralized.

Legislature. Legislative power is vested jointly in the crown and the States General. The latter consists of the first or upper chamber and the second chamber. The 75 members of the first chamber are elected by the governing bodies of the provinces for six-year terms, half of the house retiring, in rotation, every three years. The 150 members of the second chamber are elected on the basis of proportional representation for four-year terms.

Legislation may be introduced only by the cabinet ministers (who are appointed by the prime minister and may not be members of the

States General) and by the members of the second chamber. The legislative powers of the first chamber are restricted to approval or rejection of measures issuing from the second chamber. Either or both chambers may be dissolved by the crown on condition that a new election be held within forty days and that a new legislative body be convened within three months of the dissolution.

Political Parties. Four major groups (Catholics, Labor, Protestants, and Liberals) form the historical foundation for the Dutch political party structure. The major parties in the 1970's included the Roman Catholic People's Party; the Labor Party; the People's Party for Freedom and Democracy, or Liberal Party; and the two Protestant parties, the Anti-Revolutionary Party and the Christian Historical Union. These parties cut across social and economic lines and occupy generally moderate positions. In foreign policy they supported the North Atlantic Treaty Organization (q.v.) and Western European integration. The more extreme philosophies of the right and left are represented by minor parties, including the Communist Party.

Local Government. Each of the eleven provinces is governed by a representative council called the Provincial States. Members are directly elected for four-year terms; and each council elects an executive committee for the province. The commissioner is the representative of the crown in the province and is appointed by the crown.

The municipalities are each governed by a municipal council, whose members are elected directly by the local inhabitants for four-year terms. Executive power is in the hands of a board consisting of the burgomaster, appointed by the crown, and two to seven aldermen, elected by the council from its membership.

Judiciary. In the Netherlands, as in some other European countries, trial by jury is unknown. Minor offenses are tried in the sixty-two cantonal courts, each court consisting of a single judge. More serious violations of the law are tried in the nineteen district courts, which consist, for the most part, of three judges each. Appeals from the decisions rendered in these courts may be taken first to one of the five courts of appeal (three judges each) and then to the high court of the Netherlands or court of cassation, which has five judges.

Defense. The Netherlands has contributed to the collective defense of the Western democracies by strengthening its ground forces since the late 1940's. The peacetime strength of the army is 76,000, plus 3500 Royal Military Police. Navy

personnel numbers about 20,000, including the Royal Marine Corps. The air force has some 21,500 personnel. Universal military training, begun early in the 20th century, remained in force in the early 1970's.

HISTORY

Historical accounts of the Netherlands date from the 1st century B.C., when Roman forces conquered most of the present area of the country. At the time the region was inhabited by Frisians, a Germanic tribe that lived in the north, and by a number of other Germanic and minor Celtic tribes.

The Roman Era. Prior to the conquest, the Romans had annexed lands to the southeast extending beyond the Rhine R. They penetrated the Netherlands region mainly to control the several mouths of the Rhine, which were then farther to the north than they are now. Under Roman rule, general peace and prosperity prevailed for more than 250 years. Roman traders entered the area freely, selling products from Italy and from Gaul. The Romans built temples, established a number of large farms, and, to a degree, civilized the region.

About 300 A.D. Roman hold began to weaken, and nonindigenous German tribes pushed into the area from the east. The Frisians, in the north, held their ground, but Saxons (q.v.) occupied the eastern part of the region and the Franks (q.v.) moved into the west and south.

The Middle Ages. The Franks were the most powerful of the invaders. Their lands extended southward into what is now northern France and eastward across the Rhine. Eventually the Frankish kings subjugated the Frisians and the Saxons and forced them to accept Christianity. By 800 the entire territory of the Netherlands was part of the realm of Charlemagne (q.v.), Holy Roman Emperor. After Charlemagne died his empire disintegrated, and in 843 the Treaty of Verdun trisected it; see VERDUN, TREATY OF. The Netherlands became part of Lotharingia (Lorraine), and still later, in 925, of the Holy Roman Empire (q.v.). At that time a Dutch nation did not exist, and the immediate loyalties of the inhabitants were to local lords.

During the 9th and 10th centuries Scandinavian pirates, called Vikings, or Norsemen (q.v.), frequently invaded the coastal areas, sailing far up the rivers to loot and kill. The need for a stronger system of defenses against such marauders gradually led to an increase in the power of the local rulers and their vassals, the nobles, who were largely a warrior class. Concurrently, the towns began to grow in importance as craftsmen and merchants settled in

them and improved their defenses. The gradual development of powerful towns was a notable feature of Dutch history during the 12th, 13th, and 14th centuries. Under the leadership of wealthy merchants the towns eventually began to challenge the power of the nobles who ruled the countryside. The merchants often supported the regional ruler in his campaigns against unruly vassals, and at the same time exacted from him privileges designed to promote commerce and to strengthen the town and the position of the merchant class.

In the early Middle Ages such political entities as the county of Holland, the bishopric of Utrecht, and the duchies of Gelderland and Brabant were established. In the north, however, the Frisians did not submit to a regional ruler but continued to obey their local headmen. The association of the Netherlands with the Holy Roman Empire remained largely nominal throughout the Middle Ages. Some trade was conducted with German coastal cities to the east, such as Bremen and Hamburg, but the major cultural influence came from France.

The Renaissance. Through marriage, war, and political maneuvering, most of the region comprising the present-day Netherlands, that is, Holland, Utrecht, Brabant, and Gelderland, came into the hands of the dukes of Burgundy during the 15th and early 16th centuries. By the mid-16th century this area, including even the land of the Frisians, was under the benevolent control of Charles V (q.v.), Holy Roman Emperor, of the Spanish branch of the house of Hapsburg (q.v.), who had been born in Ghent (in what is now Belgium). In 1555–56, however, Charles resigned both Spain and the Netherlands to his son, Philip II (q.v.), who was Spanish by birth and education and had little liking for his northern European territories. The oppressive rule of Philip led to the epochal war of independence waged from 1568 to 1648 by the Dutch against Spain, then the most powerful nation in Europe.

The Struggle for Independence. The political disaffection between the Netherlands and Spain coincided with the Protestant revolt against the Roman Catholic Church, which was the state church of Spain. Calvinism (q.v.), a Protestant movement, rapidly gained ground during this period; its adherents established in the Netherlands a well organized church that was prepared to challenge the Roman Catholic Church, particularly the Inquisition (q.v.). Iconoclastic riots in 1566 caused Philip to send to the Netherlands Spanish troops commanded by Fernando Álvarez de Toledo, Duke of Alva (q.v.). The exces-

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William I, Prince of Orange, known as William the Silent. Mauritshuis, The Hague

sively harsh policies of the duke and of the Inquisition resulted in open revolt by the people of the Netherlands. William the Silent, Prince of Orange (see WILLIAM I), who was one of the principal noblemen of the region, led the revolt. In 1579 the Union of Utrecht, an anti-Spanish alliance of all northern and some southern territories, was formed. In addition to its political implications the union signified the final divergence of the largely Protestant northern part of the Low Countries, which later became the Netherlands, from the predominantly Catholic southern part, which later became Belgium. In 1581 the Dutch provinces within the Union of Utrecht proclaimed their independence from Spain. Subsequently, the new nation suffered a series of reverses in the war with Spain, sustaining a major loss when William the Silent was assassinated in 1584. By 1585 the Spanish had reconquered practically all of the south, including the important port of Antwerp. Eventually, however, the tide of war turned in favor of the Dutch. From 1585 to 1587 English troops were sent overseas to aid the insurgent cause, and in 1588 the English destroyed the great Spanish Armada (q.v.), a victory that drastically curtailed the ability of Spain to wage war abroad. The

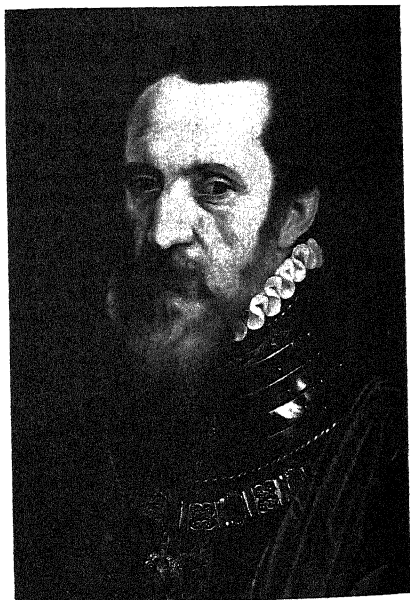
seven provinces in the Union of Utrecht were cleared of Spanish troops by 1600.

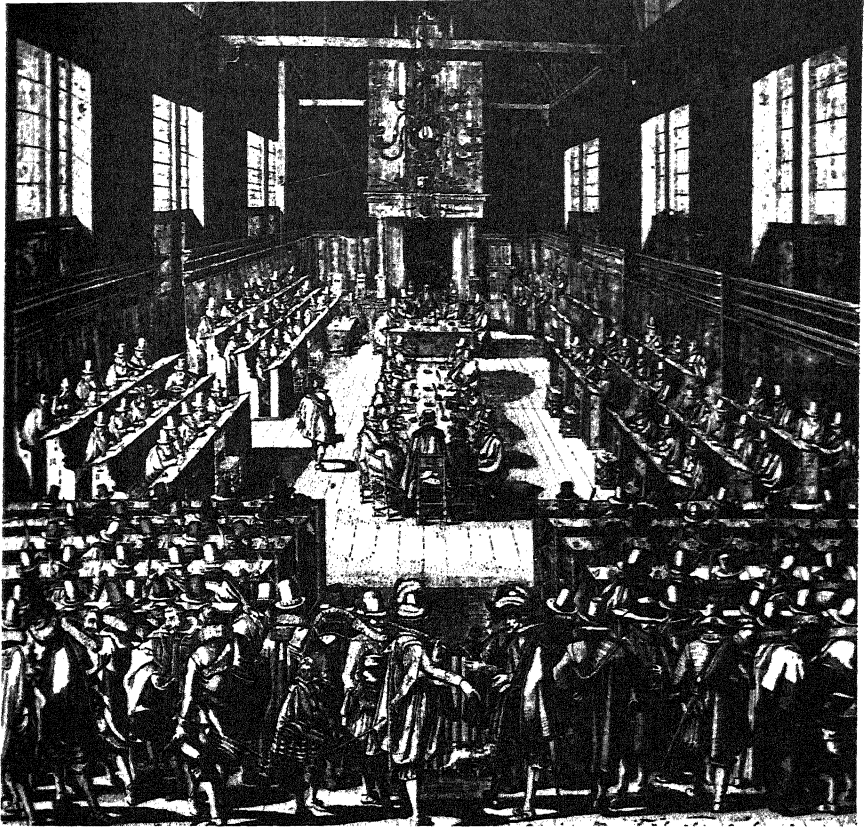
From 1609 to 1621 a truce was in effect between the Spanish and the Dutch, but the war subsequently dragged on until 1648, when the Spanish signed the Treaty of Münster, by which the sovereignty of the Dutch Republic of the United Provinces was recognized. The republic thus severed all theoretical ties with Spain and the Holy Roman Empire and became one of the great powers on the continent, a republic in the midst of monarchies.

The Golden Age. In the early 17th century when eventual Dutch independence was assured, an era of great commercial prosperity opened, as did the so-called golden age of the republic in art and literature. By the mid-17th century the Netherlands was the foremost commercial and maritime power of Europe, and Amsterdam was the financial center of the continent. Seafaring and trading had long been important occupations in the Low Countries. They were fostered by the development of a herring-fishing industry, as well as the cargo trade between the Netherlands and various European and Mediterranean ports. Among the products transported were salt, fish, cloth, tim-

Fernando Álvarez de Toledo, Duke of Alva. Commissioned by Philip II of Spain, he led Spanish troops to suppress the revolt in the Netherlands in 1567.

Rijksmuseum Amsterdam





ber, grains, flax, and ores. The maritime trade was carried on primarily out of such small ports around the Zuider Zee as Hoorne, Enkhuizen, Staveren, Medemblik, Kampen, and Amsterdam, and out of such southwestern ports as Dordrecht, Rotterdam, Middelburg, Veere, Antwerp, and Bruges. After Spain reconquered the southern provinces, the port of Antwerp and the smaller southern ports virtually ceased to function.

EXPLORATION AND COLONIZATION. About 1600 a Dutch merchant expedition of three vessels sailed from Amsterdam to Java. This was the first of numerous journeys that left Dutch geographic names scattered over the globe, from Spitsbergen to Cape Horn and from Staten Island to Tasmania. These voyages resulted in the establishment or acquisition of many trading stations in Africa, Southeast Asia, and America.

In 1602 the Dutch parliament granted to the Dutch East India Company a charter that gave it a trading monopoly with all countries east of

The Synod of Dort (1618-19) was convened to settle theological differences between Calvinists, mostly supporters of the house of Orange, and Arminians, chiefly Dutch Republicans under the leadership of Jan van Olden Barneveldt, that were dividing the people of the Netherlands.

the Cape of Good Hope in Africa and west of the Strait of Magellan in South America; see **EAST INDIA COMPANY**. The charter also conferred many sovereign powers on the company, including the right to wage war and to conclude peace. The West India Company, founded in 1621, received a similar monopoly in the area west of the Cape of Good Hope and east of the Strait of Magellan.

The East India Company established itself first in the Moluccas, or Spice Islands, and later on West Java, where Batavia (modern **Djakarta**) became the center of the company's enterprises. These enterprises were devoted mostly to trade and to the establishment of trading posts. Their functions generally did not include governing. Subsequently, pressed by the necessity of maintaining peace among the native rulers, the

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Dutch began to govern the territories presently called Indonesia in order to maintain trade.

Shortly after its founding, the West India Company acquired trading stations and some coastal territory in the Caribbean, in what is now Brazil, and in West Africa. The Dutch purchase in 1626 of Manhattan Island, which marked the beginning of the colony of New Amsterdam, was considered a minor transaction. The purchase was largely a result of an unsuccessful attempt by Henry Hudson (q.v.), an English explorer in the service of the company, to find a sea route to China and the Indies around North America.

The chief profits of the West India Company were derived more from piracy than commerce, as its fleets preyed upon the vessels carrying treasure from Latin America to Spain. Thus the company never really secured the areas it occupied, and most of its overseas possessions were eventually lost. Only some small Caribbean islands (the Netherlands Antilles) and an area on the northern coast of South America (Surinam) remained under Dutch control in the 1960's. **THE DUTCH WARS.** Inevitably, the Dutch and the English, the leading maritime trading nations of the world, came into sharp commercial rivalry and military conflict. The issues between the two countries were contested, but not settled, by the first and second Anglo-Dutch Wars, waged in 1652–54 and 1665–67 respectively. As a result of the latter conflict the Dutch lost New Amsterdam but acquired Dutch Guiana (now Surinam). Other wars, costly in men and money, followed against England, France, and other countries.

The 18th Century. After the war of 1702–13 (see **SPANISH SUCCESSION, WAR OF THE**), in which the Dutch were allies of the British against the French, the economic and political power of the Netherlands began to decline. Eventually the Dutch Republic was overshadowed by the expanding power of Great Britain on the sea and France on the land.

Until 1702 when William III (q.v.), who was also king of England, died without heirs, members of the house of Orange had been stadtholders. The functions of the stadtholders included leadership of the armed forces and the judiciary and the appointment of city magistrates from nominations submitted by the municipal councils. In 1702, a distant relative of William, John William Friso, successfully claimed the Orange title. In 1747 his son became stadtholder, as William IV (1711–51), in all seven provinces, and the succession was made hereditary in the Orange family.

In the late 18th century a struggle broke out between the party of the house of Orange, which had become conservative, and the Patriot Party, which desired democratic reforms. The former party enjoyed a brief triumph, but in 1795 French troops and a force consisting of self-exiled Dutch citizens replaced the Republic of the Seven United Provinces with the so-called Batavian Republic, modeled on the revolutionary French republic.

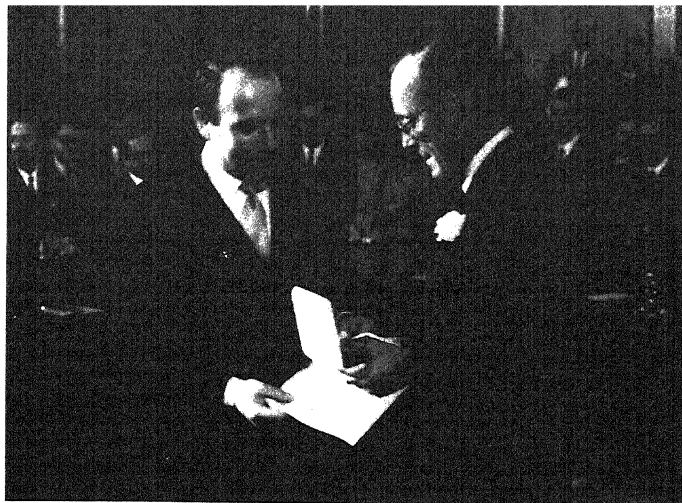
The 19th Century. The new Dutch republic survived only until 1806, when Napoleon I (q.v.), Emperor of France, transformed the country into the Kingdom of Holland. In 1810 he incorporated it into the French empire. While the Dutch were under French rule, the British seized Dutch colonial possessions. After the fall of Napoleon, the independence of the Netherlands was restored in 1815 by the Congress of Vienna; see **VIENNA, CONGRESS OF**. In addition the territory now comprising Belgium was made part of the kingdom of the Netherlands.

The reunion of the northern and southern regions was not a happy one, for the two areas had become widely disparate in political background, tradition, religion, language, and economy. In 1830 the Belgians revolted and established their independence as a sovereign state. A conference in London of the major European powers formulated the conditions of separation in 1831. The stipulations were accepted by the Dutch king, but when they were later revised by the conference in favor of the Belgians, a Dutch army invaded Belgium and routed the opposing forces. The condition of separation were again revised and were finally accepted by both countries in 1839.

The second half of the 19th century was marked by a liberalization of the Netherlands government under the impact of the revolutions that had swept Europe during the 1840's. The seeds of reform were contained in the new constitution of 1848, which became the foundation of the present democracy. Under its provisions arbitrary personal rule by the monarch was no longer possible. The members of the first chamber of parliament, who had formerly been appointed by the king, were thereafter elected by the Provincial States. Members of the states and of the second chamber of parliament were chosen by all persons paying taxes in excess of a stipulated sum. The almost solidly Roman Catholic southern provinces of Limburg and North Brabant, treated as conquered territories under the republic, had been given equal status with other provinces under the monarchy, but it remained for the constitution of 1848 to remove

Prince Bernhard (right) of the Netherlands receiving the Nansen Medal in 1967 from Prince Sadruddin Aga Khan, the United Nations High Commissioner for Refugees. The prince was honored for leading a campaign to aid refugees in Asia and Africa.

United Nations High Commissioner for Refugees



the religious restrictions against their citizens. Thus a powerful Roman Catholic political party was able to form and to contend with the Liberal group and the emerging conservative Protestant parties. Through the late 19th century suffrage was gradually extended, and agitation for social reform increased markedly. The rise of a strong labor party and the organization of workers into labor unions resulted in further social reforms.

Administration of the colonies was also reformed. In 1816, when the British returned the Dutch colonies that they had annexed during the Napoleonic period, effective imperial control in the Netherlands East Indies (now Indonesia) extended over only a small part of the territory. The Dutch colonial empire during the 19th century was expanded largely by peaceful means. Much of the East Indies was left under direct control of native rulers, who were induced to recognize the sovereignty of the government in Batavia. Burdensome taxation was gradually abandoned, and, after 1877, no financial surpluses from Indonesia were used for the benefit of the treasury of the Netherlands.

The 20th Century. From about 1880 to 1914 the Netherlands enjoyed an era of economic expansion. This period ended during World War I, when the nation suffered hardship through loss of trade as a result of the Allied blockade of the continent. The principal postwar problems of the country were economic, and these were aggravated by the depression of the 1930's.

At the outbreak of World War II the Netherlands again declared its neutrality, but in 1940 the country was overrun by the Germans, following an aerial bombardment that destroyed the greater part of Rotterdam. Much destruction

was also wrought in other parts of the country not only by the Germans but also by the Dutch, who opened many dikes as desperate defense measures, and later by the Allies in aerial assaults on German-held positions. The Germans occupied the country until ousted in 1944-45.

The years following World War II were marked by intensive efforts to rebuild the country and to restore its trade and industry. In 1945 the Netherlands became a charter member of the United Nations. In 1948 it received funds through the European Recovery Program (q.v.). The Netherlands concluded the Brussels Treaty with France, Great Britain, Belgium, and Luxembourg in 1948, joined the European Coal and Steel Community (q.v.) in 1950, and subsequently became a member of the North Atlantic Treaty Organization (q.v.) in 1949, the European Defense Community (E.D.C.) Treaty in 1952, and the London-Paris accords in 1955, thus becoming a full-fledged member of the West European multinational defense establishment. The period of the late 1940's and early 1950's was also a time of rising prices, generally unfavorable trade balances, and successive governments dominated by the Labor Party.

Meanwhile, the Netherlands lost a war against Indonesian nationalists in the East Indies. On Feb. 16, 1949, after three years of fighting, the Dutch agreed to accept in principle a peace plan sponsored by the U.N. Security Council. The Netherlands and the Indonesians concluded a truce on May 7, 1949, and held a round-table conference between August and November. Agreement was reached on the establishment of the United States (later Republic) of Indonesia, and the Statute of the Netherlands-Indonesian Union was signed. This statute

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provided for the voluntary association of the two countries in a union under the Dutch crown. On Dec. 27 the Netherlands formally transferred sovereignty in the East Indies (excluding Netherlands New Guinea) to the Indonesian government. See INDONESIA, REPUBLIC OF.

On Dec. 15, 1954, Surinam and the Netherlands Antilles were formally granted self-rule except in foreign affairs and defense. The Dutch government refused, however, to surrender its sovereignty over Netherlands New Guinea, which the Indonesians were insisting be incorporated into the Republic of Indonesia. On Feb. 15, 1956, the Indonesian government withdrew from the Netherlands-Indonesian Union and in December, 1957, it seized all Dutch holdings in the republic, severed economic ties with the Netherlands, and ordered the expulsion of all 46,000 Dutch nationals residing in Indonesia.

The problem of absorbing evacuees from Indonesia into the economy of the Netherlands was heightened by the spread of domestic unemployment, which had nearly tripled during 1957. The economic crisis reached a peak during 1958, and in March, 1959, the Roman Catholic People's Party won a plurality in the lower house of parliament and formed a new coalition government with several minority conservative parties, ending a long period of Labor Party ascendancy. By the end of 1960 the economy had generally improved and the rate of unemployment had declined greatly. The amelioration was attributed partly to Dutch membership in the European Economic Community (q.v.), popularly called the Common Market, which had gone into effect on Jan. 1, 1958. An equally important spur to the Dutch economy in the 1960's was the creation of the Benelux Customs Union, now the Benelux Economic Union (q.v.).

From early 1961 to early 1962, Indonesia and the Netherlands again attempted to negotiate a settlement of the dispute over Netherlands New Guinea. On March 26, 1962, negotiations were suspended. During the succeeding months Indonesian troops infiltrated the territory and clashed with Dutch forces. Negotiations were resumed in July and an agreement was concluded on Aug. 15. Under its terms the U.N. administered the territory from Oct. 1, 1962, to May 1, 1963, when Indonesia incorporated it as the province of West Irian.

Recent Events. The Roman Catholic People's Party retained pluralities in the lower house in the elections of 1963 and 1967, but the government coalitions that the party formed in the 1960's fell several times. Unrest in the Netherlands beset the government in 1969, and

marines were dispatched to assist police in riot control. The inflation of the 1960's continued into the 1970's as a major political problem. Wage and price controls were imposed in 1970, and taxes increased in 1971. In the elections of 1971 the four-party governing coalition lost its majority, and after two months of efforts a coalition headed by the Anti-Revolutionary Party formed a government. This cabinet fell in 1972, however, and a caretaker government ruled until May, 1973, when Joop den Uyl (1920-), leader of the Labor Party, was sworn in as premier of a five-party coalition. The government adopted austerity measures against inflation.

In the mid-1970's unresolved problems with respect to its former overseas territories continued to plague the Netherlands. When Surinam was granted full independence in 1975, hundreds of thousands of Surinamese emigrated to the Netherlands, placing a further strain on the economy. Armed terrorists acting in the name of South Moluccan independence from Indonesia twice hijacked trains south of Amsterdam and held their passengers hostage.

In 1977, following parliamentary elections in the spring, the governing coalition of Premier den Uyl fell apart over proposed reforms. A new premier, Christian Democrat Andreas van Agt (1931-), was sworn in at year's end.

NETHERLANDS WEST INDIES. See NETHERLANDS ANTILLES.

NETTLE, common name applied to herbs of the genus *Urtica*, of the Nettle family, Urticaceae, capable of producing a skin rash on contact. The common stinging nettles, which are



Eastern nettle, *Urtica procera*

found throughout most of the United States and Canada, are annual or perennial weeds that grow in waste areas, disturbed soils, hedgerows, and roadsides, often in rich soils. The common eastern nettle, *U. procera*, is a coarse, erect plant, with sparsely branched stems as high as 7 ft. All nettles bear opposite, simple, toothed leaves, and inconspicuous reduced flowers; the sexes are separate in some species. Both leaves and stems are covered with stinging hairs. On contact, these hairs release into the skin a poison which provokes an itching inflammation (dermatitis) of short duration. This reaction is a primary irritation as opposed to the allergenic reaction of poison ivy (q.v.) and does not depend on a pre-existing sensitivity. J.M.K.

NEUCHÂTEL, town in Switzerland, and capital of Neuchâtel Canton, on the Lake of Neuchâtel, about 30 miles N.W. of Bern. The town, surrounded by dairy farms and vineyards, produces wine and chocolate. In Neuchâtel are a castle, begun in the 12th century, the Collegiate Church (13th cent.), and the University of Neuchâtel (1838). Part of Burgundy in the 11th century, Neuchâtel passed to the house of Orléans-Longueville in 1504 and to Prussia in 1707. It joined the Swiss Confederation in 1815. Pop. (1970 est.) 36,600.

NEUCHÂTEL, LAKE OF, the largest lake entirely within Switzerland. It is on the borders of Neuchâtel, Vaud, Fribourg, and Bern cantons, at an elevation of more than 1400 ft. above sea level. It is 24 mi. long, between 4 and 5 mi. wide, and 500 ft. deep.

NEUILLY, or **NEUILLY-SUR-SEINE**, city of France, in Hauts-de-Seine Department, on the Seine R., immediately N.W. of Paris, of which it is a suburb. Near the Seine stood a castle that was the residence of King Louis Philippe (q.v.), but which was burned during the Revolution of 1848. Pop. (1968) 71,215.

NEUILLY, TREATY OF, treaty signed at Neuilly, France, on Nov. 27, 1919, between the Allies of World War I (q.v.) and defeated Bulgaria. By its terms Bulgaria ceded small portions of territory to Yugoslavia, whose independence she thus recognized, and gave up her part of Thrace (q.v.) to Greece, thus sacrificing the Bulgarian seaboard on the Aegean Sea (q.v.). Dobrogea (q.v.) was restored to Rumania by the terms of the treaty.

NEUMANN, Balthasar (1687-1753), German architect known especially for his splendid rococo palaces and churches; he also designed fortifications, hydraulic systems, bridges, and other structures, many of superlative quality.

Born in Eger, Bohemia, where he was bap-

tized Jan. 30, 1687, Neumann first worked in a foundry, then settled in Würzburg and studied civil and military engineering. After military service abroad he entered the employ of the counts of Schönborn, bishops of Würzburg, for whom he built the Residenz (1719-46), an elegant late baroque palace with a great stair hall decorated with a ceiling painting by Giovanni Battista Tiepolo (q.v.). Among the scores of major religious structures he designed were the pilgrimage church of Gössweinstein; the Vierzehnheiligen pilgrimage church, an outstanding example of the German rococo; the Marienkirche, near Würzburg; and the abbey church of Neresheim. Neumann taught architecture at the University of Würzburg and for twenty years supervised all construction in the principalities of Würzburg and Bamberg. He died at Würzburg Aug. 19, 1753.

NEUMANN, John von (1903-57), American mathematician, born in Budapest, Hungary, and educated at the Technische Hochschule in Zürich, Switzerland, and at the universities of Berlin and Budapest. He came to the United States in 1930 to join the faculty of Princeton University; in the following year he was appointed professor of mathematical physics there. After 1933 he was associated with the Institute for Advanced Study in Princeton, N.J. He became a U.S. citizen in 1937, and during World War II served as a consultant on the Los Alamos atomic-bomb project. In March, 1955, he became a member of the U.S. Atomic Energy Commission.

Von Neumann was one of the world's outstanding mathematicians. He is noted for his fundamental contributions to the development of the branch of mathematics (q.v.) known as the theory of games, which uses analytical methods similar to those used in card and dice games. His theoretical work made possible the design of high-speed calculators; see **COMPUTER**. In 1956 the Atomic Energy Commission, in recognition of Von Neumann's contributions to the theory and design of electronic computers, granted him the \$50,000 Enrico Fermi Award.

NEUMÜNSTER, city of West Germany, in Schleswig-Holstein State, on the Schwale R., 18 miles S.W. of Kiel. A rail junction with railroad shops, woolen textile mills, foundries, and paper mills, the city also produces leather products, electric goods, and soap. Partly destroyed in World War II, the city has been rebuilt in ultra-modern style. The original rural settlement of Wippendorf, founded in the early 1100's, lay below the fortress of Wittorfer Burg, dating from the time of Charlemagne (q.v.), Holy Roman

NEURALGIA

Emperor. The modern city was chartered in 1870. Pop. (1970) 86,100.

NEURALGIA, term designating the existence of dull, aching, or even sharp, intermittent or constant pain along a nerve trunk or its branches; see **NERVOUS SYSTEM**. The manifold types of neuralgia are distinguished according to the nerve affected or to the underlying cause. The pain may be a symptom of a wide variety of diseases. It may be caused by a virus that attacks the nerve, as in the case of herpes zoster (shingles); it may be the result of toxic conditions such as may be caused by alcohol or lead poisoning; it may be associated with localized infections of the teeth, ears, tonsils, or sinuses; or it may result from injury, vitamin deficiency, or pressure on the nerve. Neuralgic pain may also be purely psychic in origin, as in the case of hysteria (q.v.); see also **MENTAL DISORDERS: Neuroses: Conversion and Other Reactions**. There are some types of neuralgia for which no adequate organic or psychic cause can be established. Among the common forms of neuralgia are trigeminal neuralgia (also known as *tic douloureux*), intercostal neuralgia, brachial neuralgia, and sciatic neuralgia. Treatment is mainly palliative, with use of medications to control pain, and often the administration of vitamin B₁₂ or B complex. In *tic douloureux*, an often recurrent neuralgia, administration of certain specific drugs may help. L.J.V.

NEURITIS, inflammation of peripheral nerves, characterized by sensory or motor disturbances, that may take the form of pain (often burning), numbness, tingling, or pins-and-needles sensations, hypersensitivity or anesthesia, in the area supplied by the involved nerve, and weakness or paralysis of the muscles innervated by it. Neuritis may be due to a variety of causes, and it may be associated with many diseases. Its severity varies depending upon the causative factors and the distribution and intensity of the involvement. Neuritis may involve one nerve or a group of adjacent nerves. It is generally the result of such localized causes as injuries, pressure from arthritis involving the spine at the area where the nerve root exists, adjacent tumors, or prolonged exposure to extreme cold. Neuritis may also involve several nerves in different parts of the body. This type usually affects the extremities. Infectious diseases, such as typhoid fever, malaria, syphilis, or tuberculosis, and diabetes, heavy-metal poisoning, alcoholism, or vitamin deficiencies associated with pregnancy, beriberi, and pellagra are causes of some types of neuritis. Neuritis may occur with collagen diseases (q.v.), hypersensitivity states, or vasculitis

(inflammation of small blood vessels). In many cases neuritis is caused by disease of the nervous system (q.v.). L.J.V.

NEUROLOGY. See **NERVOUS SYSTEM: Disorders of the Nervous System**.

NEUROPTERA. See **ANT LION**.

NEUROSIS. See **MENTAL DISORDERS; PSYCHIATRY**.
NEUSS, city and port of West Germany, in North Rhine-Westphalia State, near the Rhine R., opposite Düsseldorf. The harbor is connected to the Rhine R. by the Erft canal. A rail junction and grain market since the 13th century, the city has diversified industries, which were rebuilt with parts of the city after World War II, during which more than one third of Neuss was destroyed. Historic sites include the 13th-century Saint Quirinus Church, the Ober-ter Gate containing the Clemens-Sels Museum, and the Zeughaus, a 17th-century arsenal, now a concert hall. Neuss has the oldest horse-racing track in West Germany.

History. Founded in 12 B.C. by the Roman general Nero Claudius Drusus Germanicus (see *under* DRUSUS), the ancient Novaesium was renamed Niusa by the Franks and was chartered in 1190. The city was besieged by Charles (q.v.). Duke of Burgundy, in the 15th century and sacked by the Italian soldier Alessandro Farnese (see *under* FARNESE) in 1586. It was under French rule from 1794 to 1813 and became part of Prussia in 1816. Allied forces occupied it on March 2, 1945. Pop. (1970) 116,000.

NEUSTRIA, name given by the Merovingian (q.v.) kings to the western portion of the Frankish Empire, after the empire was divided by King Clovis I (q.v.) in 511 A.D. Neustria extended originally from the Schelde to the Loire rivers, and was bounded by Aquitania on the S. and by Burgundy (qq.v.) and Austrasia on the E. In 687 Neustria was reunited with the rest of the empire by Pepin of Herstal (see *under* PEPIN), an early Carolingian (q.v.) ruler.

NEUTRA, Richard J(oseph) (1892-1970), American architect, born in Vienna, Austria, and educated at the Technische Hochschule in Vienna and the University of Zürich. In 1923 an international prize for architecture enabled him to travel to the United States. After moving to California in 1925, Neutra early established his reputation for the design of the Lovell House (1929), which is characterized by technological and structural innovations along the lines of the international style, that is, modern architectural design emphasizing function and typically austere in appearance. A follower of the noted American architect Frank Lloyd Wright (q.v.), Neutra believed that a building should be inte-

grated with its site. These ideas were carried out not only in his designs for private dwellings but also in major urban design projects, both in America and abroad. He discussed his architectural ideas in *Mystery and Realities of the Site* (1951), *Survival Through Design* (1954), and *Life and Human Habitat* (1956). Neutra was naturalized as a U.S. citizen in 1929. See AMERICAN ARCHITECTURE: *Modern American Architecture: The International Style*.

NEUTRALITY, in international law, legal status of a state that adheres to a policy of nonengagement during war. The rules covering wartime relations between a neutral and a belligerent (q.v.) were formulated largely in response to situations that developed during the limited conflicts of the 18th and 19th centuries. One of the first clear formulations of a doctrine of neutrality was embodied in two early United States documents: the proclamation of neutrality issued by President George Washington (q.v.) in 1793 and the American Neutrality Code of 1794. A landmark document relating to the maritime relations of neutrals and belligerents was the Declaration of Paris (q.v.), issued in 1856. The rights and duties of neutrals were codified in the 5th and 13th Hague conventions of 1907 and in the Declaration of London of 1908, which however, was not ratified. See HAGUE CONFERENCE; LONDON, DECLARATION OF.

Rules of Neutrality. The complicated rules of neutrality are based, for the most part, on two deceptively simple assumptions: namely, that a neutral state, being neither judge nor party in the conflict, must show impartiality in its dealings with belligerents on both sides, and that belligerents must respect the sovereignty of neutral states. Accordingly, throughout a war, neutral states continue diplomatic intercourse with all belligerent states. A neutral state may not give armed assistance to any belligerent, or lend money, or guarantee a loan to either side, or permit its territory to become a base for hostile operations. Although it may permit the innocent passage of belligerent vessels through its territorial waters (q.v.) it is expected to intern belligerent troops and aircraft that enter its jurisdiction.

These rules apply to the relations of belligerents and neutral governments. The relations of belligerents to private citizens of neutral states involve greater difficulties. Neutral governments are expected to prevent their citizens from fitting out military expeditions in neutral territory, and they may not protect their citizens from penalties incurred from committing unneutral acts. Neutral governments are not obliged to

restrain their citizens from selling war supplies or lending money to belligerents if the citizens have the same legal right to trade with both sides. A belligerent, moreover, is not prohibited from attempting to intercept such commerce between neutrals and its enemy. On the high seas, belligerents have the right to stop and search neutral vessels and to capture them if there is evidence that they are carrying contraband (q.v.) to the enemy, breaking a blockade (q.v.), or engaging in unneutral service. On a neutral vessel only contraband is liable to confiscation although other goods on board may be owned by a belligerent citizen. If more than half the cargo on a neutral vessel (as measured by value or freight, volume or weight) consists of contraband, the neutral vessel itself may be condemned. Condemnation of a neutral vessel or cargo, however, must always be settled by adjudication in a prize court which may award damages to the owner if the evidence is insufficient to show "probable cause" for capture. A belligerent may also proclaim a blockade of enemy ports. If such a blockade is effective, the belligerent may capture, and the prize court may condemn, neutral ships that are seeking to leave or enter blockaded ports. See SEARCH, RIGHT OF.

Neutrals and belligerents often disagree regarding the interpretation of these rules. Neutral countries have usually advocated a very limited definition of contraband and the least possible interference with their shipping by insisting that their vessels may not be taken into port for search, that "probable cause" for capture must be found by search at sea, and above all, that their vessels must not be sunk. Belligerents have tended to favor a broad definition of contraband and to interpret their rights to intercept neutral commerce as including not only ships bound for enemy ports but also, under the doctrine of "continuous voyage", ships bound for neutral ports and carrying goods that may ultimately be received by an enemy. They have also held that if it is impossible to take a vessel liable to capture to one of their ports, they may take it to a neutral port for internment, or sink it, providing passengers and crew are put in a place of safety. During the two world wars, for example, Great Britain defined almost every conceivable type of commodity as contraband and asserted the right to intercept neutral ships going from one neutral port to another if statistical or other evidence indicated that cargo carried by the ship might be destined for its enemy. In view of the difficulties of searching large ships at sea and the danger of enemy submarines, neutral ships were often taken into port for search. Ger-

NEUTRALITY

many, being unable to rival the success of the British navy in intercepting ships and enforcing a blockade of enemy ports, and being unable to bring captured vessels to port because all her ports were blockaded, responded to the British policy with submarine warfare, even sinking enemy and suspected neutral vessels at sight. As a neutral during the early stages of both world wars, the U.S. objected to such practices of Germany and Great Britain, and German violation of neutral rights, especially the sinking of enemy vessels carrying American passengers (see *LUSITANIA*), was a major cause of U.S. entry into World War I (q.v.). In reaction to the Italo-Ethiopian War as well as the impending threat of World War II (q.v.), Congress passed a series of neutrality acts between 1935 and 1937. Among other provisions, these laws placed an embargo on exports of war matériel to belligerents, warned American citizens that they could not expect protection if they traveled on belligerent ships or in war zones, prohibited loans to belligerents, and instituted the so-called cash-and-carry policy which specified that a belligerent could only obtain raw materials from the U.S. if it paid for them on delivery and carried them on its own vessels. Soon after the outbreak of World War II Congress repealed the arms embargo, and in 1940 the other provisions of the neutrality acts were repealed or by-passed so that aid might be provided to Great Britain in the form of arms shipments, and under Lend Lease (q.v.), justified on the ground that German aggressions violated the Kellogg-Briand Pact (q.v.) and relieved the U.S. of the normal neutral duty of impartiality.

Alternatives to Neutrality. The virtually complete breakdown of neutrality that marked the two world wars reflected changes in the nature of warfare (q.v.) and the growing economic interdependence of nations throughout the world. During the two world wars vast quantities of munitions, vehicles, equipment of all kinds, and other goods were required, and productive capacity became crucial to victory. Economic targets were as important as military targets, warfare covered entire nations, and weapons became increasingly destructive and difficult to control, thus increasing the likelihood that neutral citizens and property might be harmed. At the same time the flow of trade from neutral nations became vitally important to the survival of most of the belligerent nations. Just as every belligerent was determined to protect its own flow of trade, so also was it anxious to disrupt the foreign trade of its enemies by any possible means. With the develop-

ment of atomic weapons, moreover, neutrality in any form became increasingly impractical.

Alternatives to neutrality already in existence after World War I included an agreement in the Covenant of the League of Nations (q.v.) that League members should take collective action against any nation that violated its covenant obligations to refrain from hostilities until the League had had nine months to attempt a settlement, or had violated the territorial integrity or political independence of a nation within the League. The Kellogg-Briand Pact of 1928, to which nearly all nations, including the U.S. were parties, went further by prohibiting war as an instrumental policy and requiring peaceful settlement of international disputes or conflicts. Although the outlawing of war and the principle of collective action broke down in such crises as the Japanese invasion of Manchuria and the Italo-Ethiopian War, these ideas were revived and amplified in the charter of the United Nations (q.v.) after World War II. United Nations military forces were used to oppose aggression in the Korean War (q.v.) and in a number of other regional wars of the 1950's and 1960's. Such action could not be used, however, to restrain illegal action by a major power which had a veto in the Security Council (q.v.), particularly the major nuclear powers, the U.S. and the Soviet Union. In their conduct of foreign policy during the third quarter of the 20th century, both these nations however, showed an awareness of the need to prevent a nuclear war by mutual deterrence and to seek ways to limit the production and possession of extremely destructive weapons; see **DISARMAMENT**. In areas where these nations or their allies developed conflicting interests, they sometimes agreed in principle to accords guaranteeing the neutrality of such areas, a practice that had been observed in the past by the neutralization of Switzerland and other areas. Q.W. & O.J.L.

NEUTRALIZATION, chemical reaction in which an acid and a base react to form salt and water; see **BASES**. See also **ACIDS**; **CHEMISTRY**; **REACTION, CHEMICAL**; **SALTS**.

NEUTRINO, fundamental nuclear particle that is electrically neutral and of much smaller mass than an electron, probably zero at rest mass; see **ATOM AND ATOMIC THEORY**; **ELECTRON**. In spite of its very small mass, the spin (q.v.) of a neutrino is significant. In beta-decay processes, the emission of electrons occurs in such a way that the total energy, momentum (qq.v.), and spin involved in the process are apparently not conserved; see **RADIOACTIVITY**. In order to account for this inconsistency, the Austrian physicist

Wolfgang Pauli (q.v.), in 1931, inferred the existence and properties of the neutrino. This hypothesis was widely accepted by physicists even before laboratory experiments proved its existence. Because it has no charge and has negligible mass, the neutrino is an extremely elusive particle; through the measurement of its recoil effect, however, research confirmed the peculiar properties ascribed to it by the hypothesis. Conclusive proof of its existence was obtained in 1956 by the American physicists Frederick Reines (1918–) and Clyde Lorrain Cowan, Jr. (1919–), in the course of rigorous experiments at the Savannah R. nuclear plant near Augusta, Ga. An antineutrino is a different particle, being emitted in electron-beta decay, while the neutrino is emitted in positron-beta decay.

Another type of high-energy neutrino, produced along with a muon in the decay of a pion, was later discovered; see MESON. When a pion decays, a neutral particle must be emitted in the direction opposite that of the muon in order to conserve momentum. It was originally assumed that this particle was the neutrino that conserves momentum in beta decay. In 1962, however, researchers using the alternating-gradient synchrotron (see CYCLOTRON) proved that the neutrino accompanying pion decay is different from the neutrino in beta decay. R.Ho. **NEUTRON**, uncharged particle, one of the fundamental particles of which matter is composed. The mass of a neutron is 1.0086654 atomic mass units (amu). The existence of the neutron was predicted in 1920 by the British physicist Ernest Rutherford (q.v.) and by Australian and American scientists, but experimental verification of its existence was exceedingly difficult because the net charge on the neutron is zero; recent evidence, however, indicates the presence of internal charges whose overall external effect cancels out.

The neutron was first identified in 1932 by the British physicist Sir James Chadwick (q.v.), who correctly interpreted the results of experiments conducted at that time by the French physicists Frédéric and Irène Joliot-Curie (see under JOLIOT-CURIE) and by other scientists. The Joliot-Curies had produced what Chadwick recognized as neutrons by the interaction of alpha particles with beryllium nuclei. When this newly discovered form of radiation (q.v.) was passed through paraffin wax, collisions between the neutrons and the hydrogen atoms in the wax produced protons, which were readily detectable; see PROTON.

The neutron is a constituent particle of all nuclei of mass number greater than 1, that is, of all

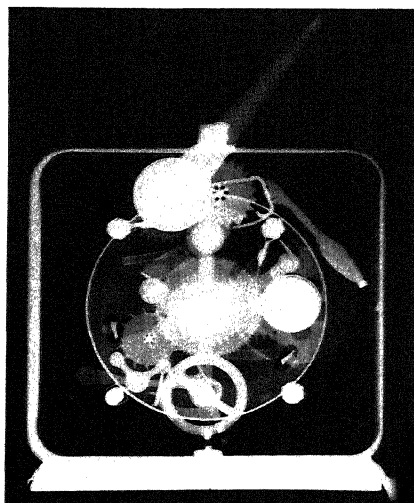
nuclei except ordinary hydrogen; see NUCLEUS. Free neutrons, those outside of atomic nuclei, are produced in nuclear reactions; they can be ejected from atomic nuclei at various speeds or energies, and are readily slowed down to very low or "thermal" energy by collisions with light nuclei, such as those of hydrogen and carbon. For the role of neutrons in the production of atomic energy, see NUCLEAR ENERGY. When expelled from the nucleus, the neutron is unstable and decays to form a proton, an electron, and a neutrino (qq.v.). Like the proton and the electron, the neutron possesses angular momentum, or spin; see MOMENTUM; SPIN. Neutrons act like small, individual magnets and this property enables the creation of beams of polarized neutrons. The neutron has a negative magnetic moment of -1.913141 nuclear magnetons; see MOMENT. Its half-life (q.v.) was fixed tentatively at about 13 min. See RADIOACTIVITY.

The antiparticle of a neutron is known as an antineutron, and has the same mass, spin, and beta-decay constant. These particles are sometimes the result of the collisions of antiprotons with protons, and possess a magnetic moment equal and opposite to that of the neutron.

Neutron Radiography. An increasingly important application of reactor-generated neutrons

Use of the neutron in photography is illustrated by this neutron radiograph of a laboratory interval timer. The layered, almost three-dimensional effect is achieved because the plastic parts of the mechanism absorb neutrons less readily than the metal parts, creating depth contrasts. The radiograph was made at the Argonne National Laboratory, a nuclear research center at Argonne, Ill.

Argonne National Laboratory



NEVADA

is in neutron radiography which obtains information by determining the absorption of a beam of neutrons emanating from a nuclear reactor or a powerful radioisotope source. The technique resembles X-ray radiography; see X RAY. Many substances, however, such as metals that are opaque to X rays, will transmit neutrons; other substances (particularly hydrogen compounds) that transmit X rays are opaque to neutrons. A neutron radiograph is made by exposing a thin foil to a beam of neutrons that has penetrated the test object. The neutrons leave an invisible radioactive "picture" of the object on the foil. A visible picture is made by placing a photographic film in contact with the foil. A direct televisionlike technique for viewing images has also been developed. First used in Europe in the 1930's, neutron radiography in the U.S. has been employed widely since the 1950's for examining the fuel and other components of nuclear reactors. Other recent applications have been in examining explosive devices and the components of space vehicles. The technique is of potential value to biological research. J.T.S.

NEVADA, one of the Mountain States of the United States, bounded on the N. by Oregon and Idaho, on the E. by Utah and Arizona, on the S. by Arizona, and on the S.W. and W. by California. In shape Nevada resembles a rectangle with the lower left part sheared off diagonally; it measures about 485 mi. from N. to S. and about 320 mi. from E. to W.

Area (7th State in rank)	110,540 sq. mi.
Land	109,889 sq. mi.
Inland water	651 sq. mi.
Population	(1970, 47th in rank) 488,738
	(1960, 49th in rank) 285,278
	(1950) 160,083
Altitude	470 ft. to 13,140 ft.
Capital	Carson City (1970) 15,468
Largest city	Las Vegas (1970) 125,787
Entered Union (36th State)	Oct. 31, 1864
Nickname	The Silver State
Motto	All for Our Country
Song	"Home Means Nevada"
Tree	single-leaf piñon
Flower (not official)	segebrush
Bird (not official)	mountain bluebird

THE LAND

Nevada, chiefly a plateau, lies almost wholly within the Great Basin. The Great Basin region extends well into Utah; it is bounded on the W. by the Sierra Nevada and on the E. by the Wasatch and lesser mountains. Numerous mountain ranges of from 7000 to 10,000 ft. divide Nevada into a series of elongated parallel valleys extending from N. to S. The principal mountains are the Humboldt, Shoshone, Monitor, and Schell Creek ranges. The highest point is Boundary Peak (13,140 ft.) in the S.W.; the lowest point, in the S.E., is 470 ft. The average elevation is 5500 ft.

Rivers and Lakes. The chief rivers are the Humboldt R., which rises in the N.E. and flows W. to disappear in Humboldt Sink; the Colorado R., which forms a short section of the border in the S.E.; and the Walker, Carson, and Truckee rivers, which rise in the Sierra Nevada and flow E. to Walker, Carson, and Pyramid lakes, respectively. Nevada has a number of other, smaller lakes within its borders. Lake Tahoe lies partly in Nevada and partly in California. Many dry lakes, such as Mud Lake, and marshy salt regions, such as Carson Sink and Humboldt Salt Marsh, lie in the west-central part of the State. Lake Mead, on the border with Arizona, is the largest artificial lake in the world; it is formed by Hoover Dam, the highest dam in the U.S., across the Colorado R. To the S. of Hoover Dam is Lake Mohave, also partly in Arizona, created by Davis Dam on the Colorado R. Other artificial lakes include Lahontan Reservoir on the Carson R. and Rye Patch Reservoir on the Humboldt R.

Climate. With its varied and rugged topography, Nevada has wide variations of weather. The outstanding climatic features are bright sunshine, little precipitation in the valleys and

Climate	Elko	Las Vegas	Reno
Normal temperatures (in ° F.)			
January maximum	36.0	55.7	45.4
January minimum	10.4	32.6	18.3
July maximum	90.4	103.9	91.1
July minimum	48.6	75.3	47.4
Annual	45.4	65.8	49.4
Normal precipitation (in inches)			
Wettest month	1.16	.51	1.21
Driest month	.41	.08	.29
Annual	9.78	3.77	7.20
Latest frost	June 6	March 13	May 14
Earliest frost	Sept. 3	Nov. 13	Oct. 2
Mean number of days between latest and earliest frosts	89	245	141

deserts, heavy snowfall in the mountains, dryness and purity of air, and wide daily ranges of temperature. In the N.E. summers are short and hot, winters long and cold; in the W. summers are also short and hot, but winters are only moderately cold; and in the S. summers are long and hot, and winters short and mild. In Reno the average daily temperature is 29° F. in January and 45° F. in July. The highest temperature recorded in the State was 122° F. (at Overton and Leeland); the lowest, -50° F. (at San Jacinto). Average annual precipitation is 5 in. in the S.W. valleys, 18 in. in the N.E., and about 28 in. in the most easterly range of the Sierras. The average annual number of days with measurable precipitation ranges from 25 at Las Vegas to 47 at Reno, 71 at Winnemucca, and 76 at Elko. Dust or sandstorms occur occasionally, thunderstorms are infrequent, and tornadoes are rare.

Plants and Animals. Distinctive plants in Nevada are the creosote bush and various spe-

cies of yucca and cacti. In the N. desert regions sagebrush is common. The squaw apple, bluebell, geranium, flowering peach, iris, violet, and larkspur are also found in the State. Trees include the sugar pine, lodgepole pine, white-barked pine, willow, alder, and mountain hemlock.

The mammals of medium size found in Nevada include beaver, badger, skunks, coyote, red fox, muskrat, bobcat, mink, weasels, yellow-bellied marmot, and porcupine. The larger forms are mountain lion, mule deer, pronghorn antelope, and black bear. The mockingbird, thrush, jay, horned lark, Nevada creeper, and bluebird are distinctive birds. Game birds include the pheasant, partridge, and sage grouse. The streams and lakes of the State are populated with about fifty-five species of fish, including carp, bass, and Mackinaw, silver, and rainbow trout.

Parks, Forests, and Other Places of Interest.

The Federal government owns 87 percent of the land in Nevada, the largest percentage in any State. A relatively small part of Death Valley National Monument (q.v.) is in Nevada, in the s.w.; the remainder is in California. Lehman Caves National Monument (q.v.), near Ely, is a group of limestone caverns. Lake Mead National Recreation Area (q.v.) is in the s.e. (partly in Arizona). The area also includes Lake Mohave. Nevada has three national forests, covering more than 5,000,000 acres. Humboldt National Forest, near Ely, contains Wildhorse Reservoir, mountains, and spectacular canyons. Inyo National Forest, in the s.w. (partly in California), contains

Boundary Peak. Toiyabe National Forest, near Carson City (partly in California), is the site of Lake Tahoe. Among the parks maintained by the state are Valley of Fire State Park, adjacent to Lake Mead; and Cathedral Gorge State Park, near Panaca.

Among other points of interest in Nevada is the Ichthyosaur Fossil Area, in Nye County, a recent paleontological discovery. Reminders of pioneer days include the many ghost towns throughout the State; the historic Ward Charcoal Ovens, near Ely; and the Sutro Tunnel, near Carson City, leading from the mines to Virginia City.

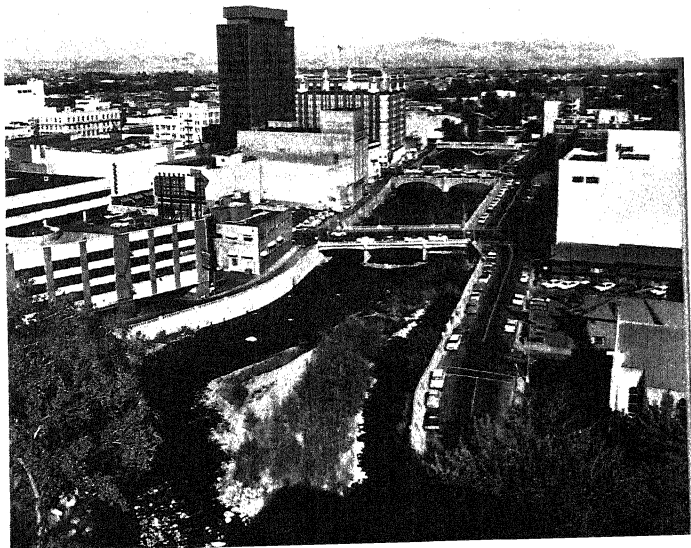
Sports. Although Nevada is generally arid, fishing is good in high mountain streams and a number of lakes. Among the species found are brook, cutthroat, and rainbow trout, kokanee salmon, Sacramento perch, black bass, crappie, bluegill, channel catfish, and—unknown elsewhere in the world—the cui-ui in Pyramid Lake. Large-game species hunted in Nevada are mule deer, antelope, elk (residents only), and bighorn sheep (by permit). Small game includes jackrabbit, ring-necked pheasant, sage and blue grouse, Hungarian and Chukar partridge, wild turkey, and Gambel's, California, and mountain quail. Popular ski runs in the State include the Reno Ski Bowl, with a 1300-ft. drop, and the Mt. Rose Ski Bowl, both near Reno; and Mt. Charleston, near Las Vegas.

THE PEOPLE

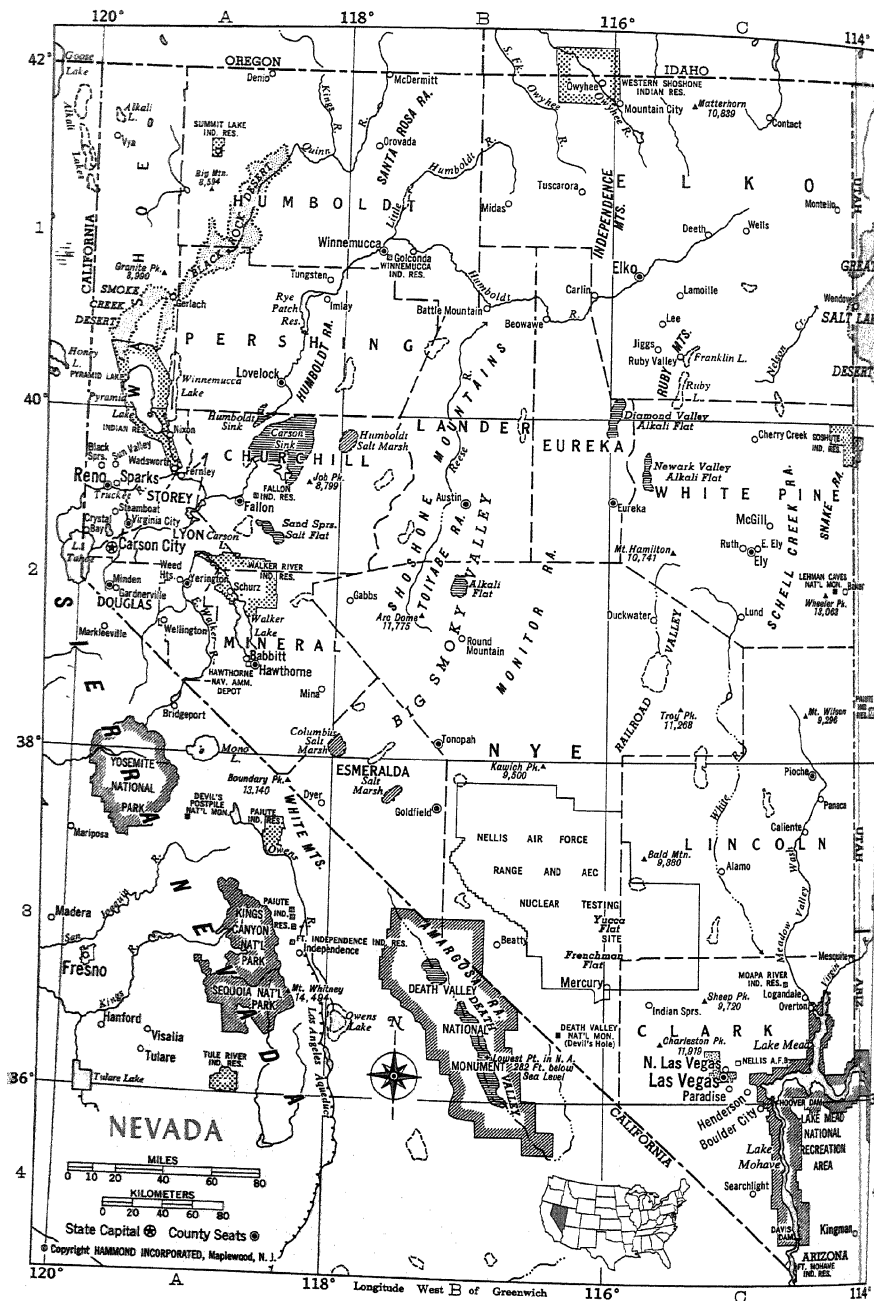
According to the 1970 decennial census, the population of Nevada was 488,738, an increase of 71.3 percent over the 1960 population. The

The Truckee River halves downtown Reno, Nev., as it flows eastward from Lake Tahoe.

Reno News Bureau



NEVADA



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urban segment comprised 395,336 persons, 80.9 percent of the total, compared with 70.4 percent in 1960. The rural segment comprised 93,402 persons, 19.1 percent of the total, compared with 29.6 percent in 1960. Ethnically, the 1970 population was distributed as follows: white persons, 448,177; nonwhites, 40,561, including 27,762 Negroes, 7933 Indians, and a sprinkling of Chinese, Japanese, Filipinos, and others. The percentage of native-born residents in 1970 was 96.3; of foreign-born, 3.7. The major countries of origin of the foreign-born, in order of rank, were Germany, Great Britain, and Austria. The 1970 population density averaged 4.4 per sq. mi., compared with 2.6 in 1960.

The chief cities are Carson City, the capital, smallest capital city in the U.S.; and Las Vegas, the largest city, and Reno, the second-largest, both gambling and tourist centers.

Indian reservations in Nevada include Duck Valley (partly in Idaho) and Fallon for the Shoshone and Paiute; Duckwater, Goshute (partly in Utah), Ruby Valley, South Fork, and Yomba for the Shoshoni; Fort McDermott (partly in Oregon), Moapa River, Odgers Ranch, Pyramid Lake, Summit Lake, Walker River, and Yerington for the Paiute; and Washoe and Dresserville for

the Washoe. Colonies of these tribes, singly or in various combinations of tribes, live in Battle Mountain, Carson, Elko, Ely, Fallon, Las Vegas, Lovelock, Reno-Sparks, and Winnemucca.

Education. The public-school system of Nevada was established in 1861. Education is free and compulsory for all children between the ages of seven and eighteen.

In 1970 public elementary schools numbered about 170 and public secondary schools, about 65. Enrollment in 1971 was about 94,000 in elementary and about 36,000 in secondary schools. Teachers in the public-school system in 1972 numbered about 2875 in elementary and about 2450 in secondary schools. In 1970 private institutions included about 20 elementary and three secondary schools; enrollment in 1971 was about 4000 elementary and 1000 secondary students. Teachers in private schools numbered about 150 in the late 1960's. In 1970 Nevada had four institutions of higher learning, three of them public; enrollment was about 13,000.

Cultural Institutions. Museums include the Nevada State Museum, in Carson City; the Nevada Historical Society, in Reno; Saint Mary's Church Museum, in Virginia City, which houses a collection of religious objects made from

NEVADA

Comstock gold and silver; and museums at Overton and Genoa.

THE ECONOMY

Nevada has a diversified economy. Per capita personal income was \$7337 in 1976, compared with \$6441 for the U.S. as a whole. Agriculture employs about 2 percent of the State's workers. Nonagricultural workers are employed, in descending order of numbers, in service industries; wholesale and retail trade; government; transportation and public utilities; construction, manufacturing, and finance; real estate; and insurance. Tourism is a major industry; resorts, gambling establishments, hotels, and motels provide jobs, and some 12,000,000 visitors spend about \$950,000,000 annually. Mining is another contributor to the economy. Compared with other States, the percentage of the population of working age is unusually high in Nevada, and that of persons aged 65 or over is below average. Between 1970 and 1976 the State's population increase was about four times the average increase for the U.S. as a whole.

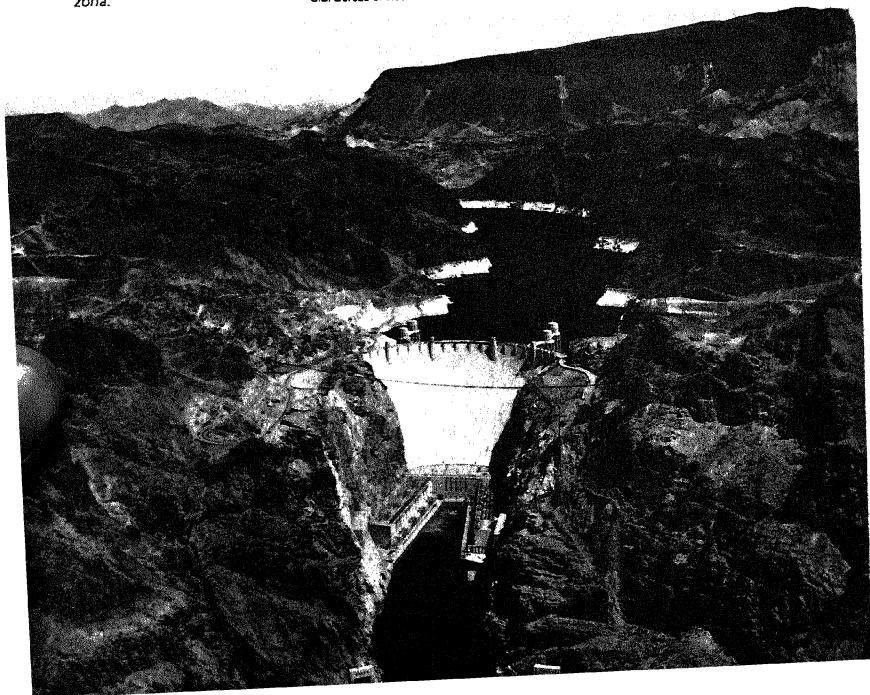
Manufacturing. According to a recent survey of manufactures, Nevada has about 8000 pro-

duction workers. Printing and publishing employ the largest numbers, followed by stone, clay, and glass products industries, and food products manufacturing. About 45 percent of the production workers are employed in the Standard Metropolitan Statistical Area (q.v.) of Reno and about 30 percent in Las Vegas. The annual value added by manufacture (see VALLEY) in the largest industries in the mid-1970's was about \$51,900,000 for stone, clay, and glass products and \$41,600,000 for chemicals. The annual value added by all manufacturing in the State was about \$309,600,000.

Agriculture. The agriculture of Nevada is dominated by the production of livestock, which accounted for about two thirds of all farm income in the mid-1970's. Principal commodities included cattle, dairy products, hay, and sheep. Other important crops were alfalfa seed, wheat, and barley. There were approximately 5400 people employed on Nevada's 2000 farms; the total area of farmland in the State was 9,000,000 acres. The average size of a farm was approximately 4500 acres. The total value of all cash receipts from agriculture was approximately \$150,000,000 per year, of which \$108,000,000 came from livestock and \$42,000,000 from crops. Nevada ranked forty-sixth in the U.S. in agricultural income.

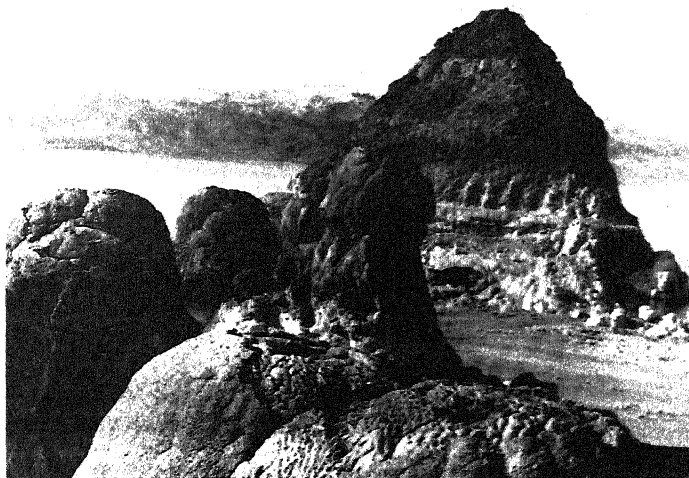
The Hoover Dam, built on the Colorado River border between Arizona and Nevada, is one of the world's largest suppliers of hydroelectric power. The dam helps to irrigate the land of California, Nevada, and Arizona.

U.S. Bureau of Reclamation



Pyramid Lake, located 33 mi. northeast of Reno, Nev., is the State's largest natural lake. Surrounded by arid desert, the lake's shoreline is barren of foliage except for sagebrush.

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Mining. Copper, gold, sand and gravel, and cement are Nevada's most valuable mineral products. Nevada ranks first in the U.S. in production of gold, asbestos, and mercury; second in production of gemstones and emery; and third in production of antimony and tungsten ores and concentrates. In the mid-1970's the total value of the State's mineral production was about \$258,000,000 per year, ranking it thirtieth among the States in income from minerals.

Energy. Generating plants in Nevada, with a capacity of 3,700,000 kw, produced about 14.2 billion kw hours of electric energy annually in the mid-1970's. About 10.7 percent of production and 20 percent of capacity were publicly owned. Hoover Dam is a major source of hydroelectric power.

Forestry. The commercial forest land of Nevada, which consists primarily of softwoods, comprises some 129,000 acres, mostly under private ownership. It produces a net annual cut of sawtimber of about 3,000,000 bd.ft.

Transportation. The first railroad in Nevada was the Central Pacific R.R., inaugurated on Dec. 13, 1867. Today the State is served by major railroads, with about 1573 mi. of track. Nevada has about 49,700 mi. of municipal and rural highways, and about 6039 mi. of Federally assisted primary and secondary roads, including 540 mi. in the Interstate Highway System. Six international and 7 local and interstate airlines operate in the State; Nevada has some 57 public and 56 private airports.

Communications. The first newspaper in Nevada was the *Scorpion*, which consisted of handwritten sheets issued at Gold Canyon Switch in 1854. The *Territorial Enterprise*, established in Genoa in 1858, was the State's first

printed newspaper; it moved to Carson City in 1859 and to Virginia City in 1860. Today Nevada has about 9 daily newspapers and 4 Sunday papers. Among the leading papers are the *Las Vegas Sun* and *Review-Journal* and the *Nevada State Journal*, published in Reno. There are about 40 radio stations and 9 television stations in the State; one of the oldest radio stations is KOH, Reno, which began broadcasting in 1928.

GOVERNMENT

Nevada is governed under the constitution of 1864, as amended. Executive authority is vested in a governor, a lieutenant governor, an attorney general, and a secretary of state, all elected for four-year terms, and other elected and appointed officials. Legislative authority is exercised by the Senate, with twenty members elected for four-year terms; and the Assembly, with forty members elected for two-year terms. The legislature meets biennially in odd-numbered years. The judiciary system consists of a five-member supreme court, a system of district courts, and other local and special courts. The State is divided into seventeen counties.

Nevada is represented in the United States Congress by two Senators and one Representative.

Voting Qualifications. Suffrage is extended generally to U.S. citizens eighteen years of age who meet the residence requirements (six months in the State, thirty days in the county, and ten days in the election district).

HISTORY

The first European believed to have entered the region of Nevada was Francisco Garcés (1738-81), a Spanish missionary and explorer, in 1775. In 1825 Peter S. Ogden (1794-1854), an employee of the Hudson's Bay Company, crossed

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the territory and reached the Humboldt R. Other trappers followed, though they were constantly harassed by Indians. On Feb. 2, 1848, at the close of the Mexican War (see MEXICO: *History*) the territory from which Nevada was formed was acquired by the United States in the Treaty of Guadalupe Hidalgo. In 1849 the Mormons (q.v.) founded a trading post in the Carson R. valley near the present site of Genoa. Most of the area of Nevada was included in the Territory of Utah when it was formed on Sept. 9, 1850. In 1853 and 1856, the inhabitants of the Carson R. valley petitioned the Federal government for annexation to California, charging that Utah did not protect its settlers.

Statehood. Until this time, Nevada had been merely a region that gold-seekers passed through on their way to California, but with the discovery of gold at the Comstock lode (q.v.) in 1859, people flocked to the area. Nevada became a territory on March 2, 1861; its eastern border was the 116th meridian. On July 14, 1862, the eastern boundary was extended to the 115th meridian, and in 1866 the State achieved its present boundaries. On Oct. 31, 1864, Nevada became a State.

The first transcontinental telegram was dispatched from Nevada to Washington, D.C., in 1864; the message affirmed the loyalty of the State to the Union. In 1879 the Sutro Tunnel, designed to drain the Comstock lode, was completed. In this period mining camps existed at Eureka, Hamilton, Aurora, Treasure City, Belmont, and Virginia City. Silver was the chief mineral mined, and when the price of silver fell in 1873 the State suffered a depression that lasted until 1900.

Farming and livestock raising aided the economic recovery of the State. Nevada's rich metal ore deposits were also tapped. But it was its gambling establishments, legalized in 1931, that opened Nevada as a major tourist center. Attracted by its warm, dry climate and vast open spaces, millions of people began flocking to the State. As the population grew, industries were attracted. Resort areas were built, and sports and recreational facilities were expanded. By the 1970's tourism accounted for an annual income of nearly \$500 million in Las Vegas alone. In response to both current and anticipated growth, Nevada has launched serious efforts to apply firm air and water pollution controls and judicious land-use management, to extend its transportation systems, and to improve its social and public services.

NEVES, city of Brazil, in Rio de Janeiro State, on Guanabara Bay opposite the city of Rio de

Janeiro, and adjoining the State capital of Niterói on the N. It is the terminus of a rail line N.E. to Cape Frio and has shipbuilding and metal-working industries. Pop. (1960) 85,741.

NEVILLE or NEVILL, name of an English noble family, originating in 1131. The outstanding members of the family were the following.

Ralph Neville, 6th Baron Neville, 1st Earl of Westmoreland (1364–1425), son of John de Neville, 5th Baron Neville (d. 1388). He was created earl in 1397. His second wife was a daughter of the English nobleman John of Gaunt (q.v.), Duke of Lancaster, and a half sister of Henry of Lancaster, later Henry IV (q.v.), King of England. Ralph assisted Henry in his struggle against Richard II (q.v.), King of England, in 1399, and was rewarded by being named marshal of England when Henry became king that same year. Ralph was the grandfather of the English kings Edward IV and Richard III (qq.v.). **Richard Neville, 1st Earl of Salisbury** (1400–60), son of the 1st Earl of Westmoreland. He became earl of Salisbury through marriage. He was appointed warden of the Scottish marches in 1434 and chancellor of England in 1454. A supporter of the house of York (q.v.) during the Wars of the Roses (see ROSES, WARS OF THE), Richard fled to France in 1459 after the Battle of Ludford. The following year he returned, and, after his faction had seized King Henry VI (q.v.) at Northampton, he was named chamberlain of England. After the Battle of Wakefield, Richard was captured by the Lancastrian forces and murdered.

Richard Neville, 2nd Earl of Salisbury, 15th Earl of Warwick (1428–71), known as "the Kingmaker", eldest son of the 1st Earl of Salisbury. In 1449 Henry VI granted Neville the earldom of Warwick, which had belonged to his wife's family. During the Wars of the Roses he supported the Yorkist faction. He was rewarded with the governorship of Calais in France in 1456. He took part in Yorkist victories at Northampton in 1460 and at Towton in 1461. King Henry was deposed from the throne of England and Edward IV was proclaimed king in 1461. Neville virtually ruled the kingdom until 1464. Increasingly at odds with Edward, in 1470 Neville fled to France and allied himself with Margaret of Anjou (q.v.), whose husband, the deposed Henry VI, was being held prisoner in the Tower of London (q.v.). That same year Neville invaded England as a Lancastrian and defeated Edward IV. Neville had Henry released from imprisonment in September, 1470, and restored him to the throne. When Edward IV returned and the Yorkists rallied to his banner,

Neville was outmaneuvered. He was slain in the Battle of Barnet.

George Neville (1433?-76), youngest son of the 1st Earl of Salisbury. In 1458 he became bishop of Exeter and in 1464 was appointed archbishop of York. From 1460 until 1467 he was chancellor of England. During the short second reign of Henry VI, from 1470 to 1471, George again held the chancellorship. He and Henry were captured at the Battle of Barnet in 1471 by Edward IV, who was again declared king. Neville was charged with treason and imprisoned in France from 1472 to 1475.

NEVIN, Ethelbert Woodbridge (1862-1901), American composer, born in Edgeworth, Pa., and educated at the Williams Conservatory and Western University, Pittsburgh, Pa., and at the Klindworth school in Berlin, Germany. He also studied music privately in Boston, Mass., and elsewhere. In 1887 he settled in Boston as a music teacher and devoted much of his time to the composition of songs. The first of his songs to gain popularity was "Oh, That We Two Were Maying" (1888). In 1891 he moved to Europe for a six-year period, during which he continued to compose songs and piano suites and worked on several orchestral compositions, none of which was ever completed. Of his numerous piano pieces the best known is "Narcissus", from the suite *Water Scenes* (1891). Among his many songs are "The Rosary" (1898) and "Mighty Lak' a Rose" (1901). His completed works are mostly short pieces characterized by an emphasis upon graceful, often sentimental, melody.

NEVINS, Allan (1890-1971), American educator, historian, and biographer, born in Camp Point, Ill., and educated at the University of Illinois. From 1913 to 1931 he was a member of the editorial staff of various newspapers and periodicals published in New York City. In 1931 he was appointed professor of American history at Columbia University; he retired from the post in 1958. Nevins is best known for his historical and biographical writings, which are characterized by freshness and clarity of style and thoroughness of scholarly research. Two of his books, *Grover Cleveland* (1932) and *Hamilton Fish* (1936), won Pulitzer prizes (q.v.). Nevins' other works include *The Ordeal of the Union* (8 vol., 1947-71) and *The Emergence of Lincoln* (2 vol., 1950). Among the letters and diaries he edited is *The Diary of John Quincy Adams* (1928).

NEVIS, one of the Leeward Islands in the West Indies. The main income is from agriculture. The chief city is the port of Charlestown. The birthplace of the 18th-century American statesman Alexander Hamilton (q.v.). Nevis is part of

the State of Saint Kitts-Nevis-Anguilla of the West Indies Associated States affiliated with Great Britain. Area of Nevis, 50 sq.mi.; pop. (1966) 15,072. See also LEEWARD ISLANDS; WEST INDIES, THE.

NEVSKI, Alexander. See ALEXANDER NEVSKI.

NEVUS. See BIRTHMARK.

NEW ALBANY, city in Indiana, and county seat of Floyd Co., on the Ohio R., 112 miles s. of Indianapolis. Principal industries include agriculture, lumbering, and the manufacture of furniture, clothing, stoves, and prefabricated houses. The home of the 19th-century American writer William Vaughn Moody (q.v.) is in the city. New Albany was settled in 1813 and incorporated as a town in 1819 and as a city in 1839. Pop. (1960) 37,812; (1970) 38,402.

NEW AMSTERDAM. See MANHATTAN: *History*. **NEWARK**, city of Delaware, in New Castle Co., about 12 miles s.w. of Wilmington. The city makes vulcanized fiber and assembles military tanks. It is the site of the University of Delaware, founded in 1743; see DELAWARE, UNIVERSITY OF. Newark was settled in the late 17th century and incorporated in 1852. Pop. (1960) 11,404; (1970) 20,757.

NEWARK, city in New Jersey, and county seat of Essex Co., on Newark Bay and the Passaic R., 8 miles w. of the southern end of Manhattan Island, about 50 miles n.e. of Trenton. Transportation facilities include six railroads; the Port Authority Trans-Hudson Corporation, operating trains to New York City through tunnels under the Hudson R., a subway system; coastal and overseas steamship lines; and Newark Airport, a principal air terminal for the New York metropolitan area. Port Newark, on Newark Bay, comprises an important part of the New York metropolitan port area, handles more cargo than all of the other ports of New York combined, and is a world leader in cargo containerization. The port has an improved harbor, with a channel 35 ft. deep and 400 ft. wide. Waterfront facilities include warehouses and miles of railroad track.

Among the educational institutions in the city are the Newark campus, including the law school, of Rutgers, The State University (q.v.); the law school of Seton Hall University (1856); the Newark College of Engineering (1881); the New Jersey College of Medicine and Dentistry, Essex County Community College; Newark Technical School; and Newark Public School of Fine and Applied Arts. Newark is an episcopal see of the Roman Catholic and Protestant Episcopal churches, and the site of several Federal and State government agencies. Cultural facilities are provided by the Newark Public Library;

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the Newark Museum, originally part of the library, with collections on art, science, and industry; and the New Jersey Historical Society. Parks and playgrounds within Newark cover an area of some 1000 acres. The Trinity Episcopal Cathedral (1743) and the First Presbyterian Church (1791) are notable landmarks. The city is governed under the mayoral system.

Commerce and Industry. Newark, the metropolis of New Jersey and one of the largest cities in the United States, is also one of the principal commercial and manufacturing centers in the country. Among the chief products of the highly diversified industrial establishments in Newark are paints, varnishes, chemicals, drugs, lubricating oil, electrical machinery and equipment, machinery and machine-shop products, metal products, motor-vehicle bodies and parts, airplanes, radio equipment, phonographs, jewelry, cutlery, leather goods, shoes, celluloid, cosmetics, malt liquors, beverages, bakery products, packed meats and other food products, cigars and cigarettes, furniture, paper boxes, and dressed furs. In addition, the city is an important retail and wholesale trade center and a leading insurance center.

History. Newark was settled in 1666 by a company of Puritans from Connecticut. The first settlement was established on a site known as the "Four Corners", now the intersection of the principal business thoroughfares, and was named after Newark-on-Trent, England, the home of one of the religious leaders of the colony. It was incorporated as a township in 1693. From 1747 to 1756 it was the site of the College of New Jersey, now Princeton University (q.v.). The present important leather industry in Newark had its beginning before the American Revolution. During the war the town and vicinity were the site of several military engagements. After the war, Newark entered upon a period of rapid industrial development. It was incorporated as a city in 1836.

Population. Between 1910 and 1950 the population of Newark increased from 347,469 to 438,776. In 1960 the population was 405,220, and in 1970 it was 382,417.

NEWARK, city in Ohio, and county seat of Licking Co., on the Licking R., 13 miles N.E. of Columbus. Newark is a transportation and trade center for the surrounding agricultural area. Major manufactures include aluminum and fiber-glass products, electrical equipment, and automobile parts. A United States Air Force missile laboratory is located in the city. Among the prehistoric Indian mounds found nearby are the 50-acre Octagon Mound and the 20-acre Circle

Mound; see MOUND BUILDERS. The city incorporated in 1860. Pop. (1970) 41,836.

NEW BEDFORD, city and port of entry in Massachusetts, and county seat of Bristol Co., on Buzzards Bay, 56 miles s. of Boston. It is the second largest fishing port in the United States. Among the important manufactures are textiles, clothing, chemicals, plastics, and processed food. The city is a resort; points of interest include the Whaling Museum and the Seamen's Bethel (1832), a chapel described by the American writer Herman Melville (q.v.) in the novel *Moby Dick* (1851). Whaling (q.v.) was an important early industry. The first New Bedford whaler was outfitted in 1755; New Bedford later became known as the greatest whaling port in the world. Whaling declined in importance after 1860, and textile manufacturing became a leading industry shortly thereafter. The site of the city was settled in 1640 as part of the township of Dartmouth. It was separated from Dartmouth in 1787 and incorporated as a city in 1847. Pop. (1960) 102,477; (1970) 101,777.

NEW BERLIN, city of Wisconsin, in Waukesha Co., about 11 miles w. of central Milwaukee of which it is a suburb. The city has light manufacturing. Founded in 1840, it was incorporated in 1959. Pop. (1960) 15,788; (1970) 26,937.

NEW BERN, city in North Carolina, and county seat of Craven Co., at the confluence of the Neuse and Trent rivers, 113 miles E. of Raleigh. The city is the shipping, fishing, and manufacturing center of a rich area producing livestock, cotton, tobacco, and lumber. Among the manufactures of the city are clothing and tools, and boatbuilding is a major industry. New Bern contains many notable buildings, including the reconstructed Tryon Palace, the colonial capitol of North Carolina. The site was settled about 1710, and the city was the seat of the first provincial convention in 1774. It was an important Confederate seaport during the Civil War until it was captured by Union forces in 1862. Pop. (1960) 15,717; (1970) 14,660.

NEW BRAUNFELS, city in Texas, and county seat of Comal Co., at the junction of the Guadalupe and Comal rivers, 29 miles N.E. of San Antonio. New Braunfels has several small industries, including flour and feed mills, a lime plant and quarries, and a meat-processing plant, but it is primarily a resort town. Comal R., 3 mi. long, lies entirely within its boundaries. New Braunfels was founded by a group of German colonists in 1845 and incorporated in 1847. Pop. (1960) 15,631; (1970) 17,859.

NEW BRITAIN, city of Connecticut, in Hartford Co., 10 miles S.W. of Hartford. New Britain is

one of the largest centers in the United States for the manufacture of hardware including tools and theatrical equipment. Central Connecticut State College, founded in 1849 in New Britain, was the first State teachers college in Connecticut. The city also has two museums. New Britain was settled in 1686 and was incorporated as a town in 1850 and as a city in 1870. The brass-works and tin shops date from the 18th century. Pop. (1960) 82,201; (1970) 83,441.

NEW BRITAIN, largest island of the Bismarck Archipelago, Papua New Guinea, in the Solomon Sea. The main city and port is Rabaul (pop., 1971 prelim., 24,778). New Britain's chief products are copra, cacao, and timber. The island has lofty mountains and active volcanoes. New Britain was named in 1700 by William Dampier (q.v.), an English navigator. The island was called Neu-Pommern while under German control from 1884 to World War I. It was administered by Australia from 1920 to 1975, except for a period (1942-45) of Japanese occupation. Area, 14,100 sq.mi.; pop. (1970) 154,000.

NEW BRUNSWICK, city in New Jersey, and county seat of Middlesex Co., on the Raritan R., 21 miles S.E. of Newark. Important manufactures include hospital supplies, pharmaceuticals, and clothing. Several colleges and the main campus of Rutgers, The State University (q.v.), founded in 1766, are located in New Brunswick. Several 18th-century houses are preserved, and nearby is the formerly active United States Army base Camp Kilmer, named for the American poet (Alfred) Joyce Kilmer (see *under* KILMER), who was born in the city. New Brunswick was settled in 1681 and incorporated in 1730. British troops were quartered here during the American Revolution, and General George Washington (q.v.) stopped here in 1776. Pop. (1970) 41,885.

NEW BRUNSWICK, one of the Maritime Provinces of Canada. It is bounded on the N. by Québec Province, on the E. by the Gulf of Saint Lawrence (see SAINT LAWRENCE, GULF OF) and Northumberland Strait, on the S.E. by Nova Scotia Province, on the S. by the Bay of Fundy (see FUNDY, BAY OF), and on the W. by the State of Maine. The province, which is nearly rectangular in shape, measures about 190 mi. in a N. and S. direction and about 160 mi. in an E. and W. direction. Its area is 28,354 sq.mi.

THE LAND

Except along the gulf coast and in the river valleys, where the terrain is generally level, New Brunswick is a region of rolling hills and low, rugged highlands. The Appalachian Mts. system is represented in New Brunswick by the Central Highlands, a belt of mountainous country,

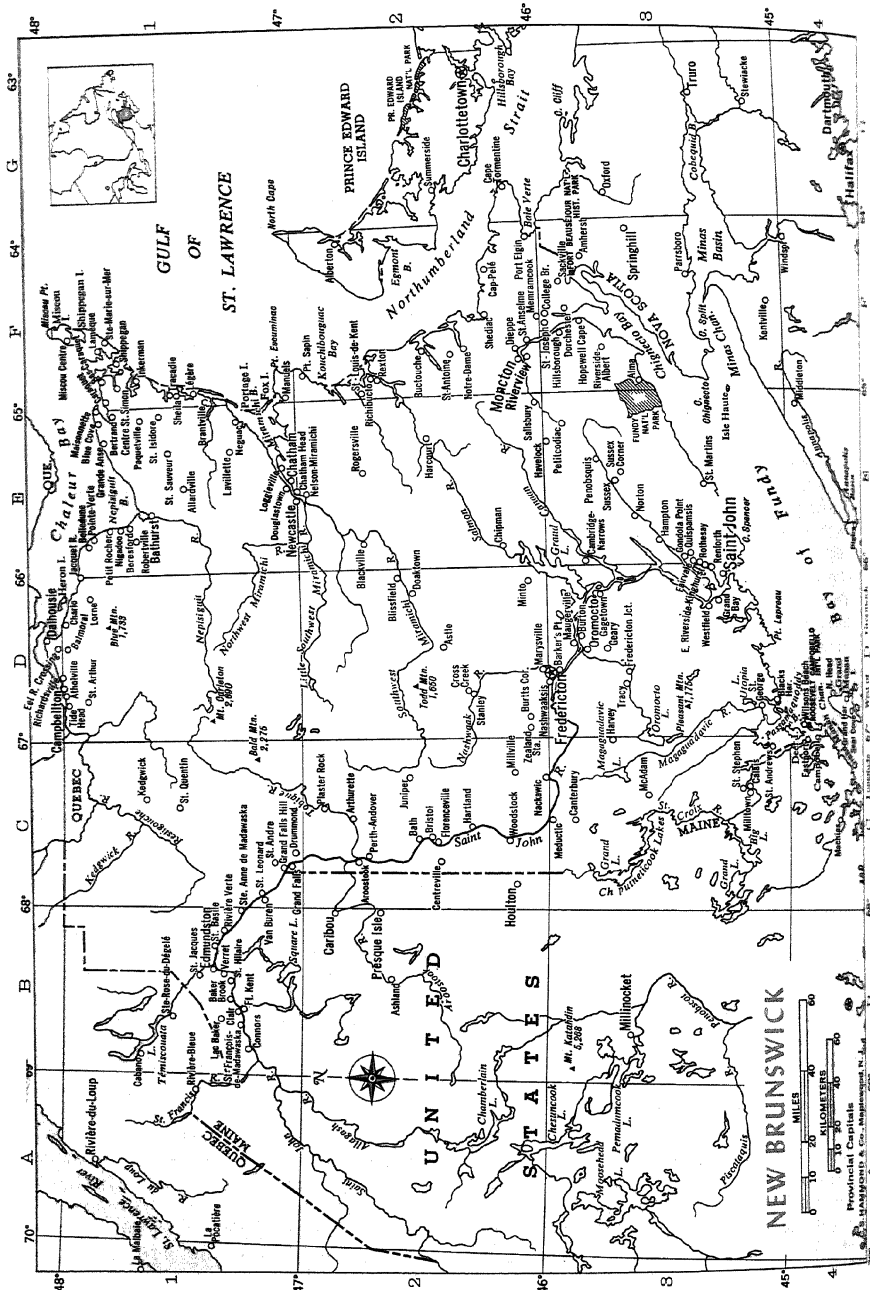
about 35 mi. wide, which crosses the N. part of the province in a general N.E. to S.W. direction. Elevations of more than 1500 ft. are common in the Central Highlands; the chief summit, Mt. Carleton (2690 ft.), is the highest point in the province. To the N. of the highlands is the Northern Plateau, which has an average elevation of about 1000 ft. The Southern Uplands, with many elevations of more than 1000 ft., lies along the Bay of Fundy in a belt about 25 mi. wide.

The terrain along the seacoast of New Brunswick is varied. The W. part of the shore along the Bay of Fundy is deeply indented and has many coves, rocky headlands, and offshore islets; the coast along the E. part of the bay, where the Southern Uplands descends to the sea, is straight and steep. The coast along the Gulf of St. Lawrence is low and has many sandy beaches. The rivers of the region terminate in estuaries that allow the passage of ships upstream for a considerable distance. Near the head of Chaleur Bay the coast becomes increasingly rugged. The remaining central and E. region of the province is mostly a rolling lowland traversed by many rivers.

Rivers and Lakes. Most of the rivers in the central region, the chief of which is the Miramichi R., flow toward the Gulf of St. Lawrence. In the W. part of the lowland region most of the rivers form part of the Saint John R. system. The St. John rises in N. Maine, enters New Brunswick at the N.W. corner of the province, and flows S. and S.E. through a rich agricultural valley. Most of the lakes in the province are along the lower course of the St. John R. The river empties into the Bay of Fundy through a rocky gorge; at high tide the waters of the bay rush upstream through this gorge, causing the spectacular phenomenon known as the Reversing Falls. Other rivers of the province include the Restigouche in the N.W. and the Petitcodiac and Kennebecasis in the S.E. Grand Lake in the S. is the only large lake in the province.

Climate. New Brunswick has a continental climate dominated by dry, cold air masses that move E. and S.E. from central Canada. Near the coast, however, the climate is modified by the sea. Temperatures in Saint John on the S. coast average about 20° F. in January and about 63° F. in July. Inland, colder winters and warmer summers are the rule. The number of frost-free days, which is often taken as a rough estimate of the growing season, ranges from 120 days in the Central Highlands to 140 days in the S.W. The average annual precipitation is about 44 in. over most of the province, with little seasonal varia-

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tion. About one quarter of the precipitation occurs in the form of snow.

Plants. About 86 percent of the area of New Brunswick is covered with forests. Most forests are called mixed forests because both hardwoods and softwoods occur; however, solid stands of one type or the other also may be found within the province. About two thirds of the growth consists of such softwoods as spruce, balsam fir, pine, hemlock, cedar, and tamarack. The more widely distributed hardwoods are birch, maple, poplar, and beech; in more limited areas oak, butternut, basswood, and elm are also found. Sphagnum moss is a common plant of the bogs on the E. coast and is important as the basis of an extensive peat-moss industry.

Animals. Wildlife is abundant throughout the province. The most common game animals are deer and moose. Black bear, red fox, porcupine, wildcat, mink, beaver, otter, and muskrat also are found. Birds in the fields and in the brush areas include grouse, pheasant, partridge, and woodcock. Among the shorebirds found are gull, tern, sandpiper, heron, cormorant, and puffin. Fish and shellfish of commercial value are present in large numbers in the rivers and coastal waters of New Brunswick.

Parks and Other Places of Interest. Scenic and recreational attractions make New Brunswick a popular all-season vacation destination. Fundy National Park, near the head of the Bay of Fundy, and Kouchibouguac National Park, along the Gulf of St. Lawrence, offer fine coastal scenery and dense forest, as well as camping and other facilities. Mactaquac Provincial Park features outdoor activities, and the nearby Opus Craft Village has resident artisans. Places of historical interest include the New Brunswick Museum, in Saint John; the Acadian Museum, in Moncton; and Fort Beauséjour, on Chignecto Bay. The s.w. portion of the province is a widely known resort area that includes historic St. Andrews and Campobello Island, long associated with the Roosevelt family. On Campobello Island is located the Roosevelt-Campobello International Park (q.v.), which is administered by a joint Canadian-American commission.

THE PEOPLE

The population of New Brunswick, according to the 1976 census, is 677,250. Settlement is principally concentrated near the coast and along the St. John R. valley. The population density is 24.5 persons per sq.mi.; about 57 percent of the population is urban. Persons of British origin account for about 58 percent of the population,

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and persons of French origin for about 37 percent. The remainder of the population comprises persons principally of Netherlands, German, and Scandinavian descent and approximately 4000 Indians.

Major cities include Saint John, one of the few ice-free ports in Canada; Fredericton, the provincial capital; and Moncton (qq.v.).

Education and Cultural Facilities. In 1967 New Brunswick completely reorganized its system of public education; control of education and complete responsibility for financing now rest with the provincial government instead of local school boards. School attendance is free and compulsory up to the age of sixteen. At one time public education consisted usually of 8 years of primary school and 4 years of high school; the province has established a system of 6 years of primary school, 3 years of intermediate or junior high school, and 3 years of senior high school.

ELEMENTARY AND SECONDARY SCHOOLS. According to the latest government estimates, in the mid-1970's about 509 public, private, and Federal elementary and secondary schools (except private kindergartens) were attended annually by about 165,500 students; full-time teachers totaled 7800.

COLLEGES AND UNIVERSITIES. New Brunswick has four degree-granting universities: the University of New Brunswick, with campuses at Fredericton and Saint John; Saint Thomas University, Fredericton; Université de Moncton, with three campuses; and Mount Allison University, Sackville. In the late 1970's total full-time enrollment was more than 11,000, and there were more than 1000 full-time teachers.

Colleges fall under the aegis of the New Brunswick Community College, organized in 1974 to provide adult education and skill-training services. There are eight permanent campuses and several extension locations.

LIBRARIES AND MUSEUMS. Library services in New Brunswick include several public libraries, as well as university and school collections. Rural areas are served by regional libraries of the Department of Youth, Recreation, and Cultural Resources.

Of the fifteen museums in the province, the most important are the New Brunswick Museum in Saint John and the museum in Fort Beauséjour National Historic Park. Historical museums are located throughout the province. King's Landing Historical Settlement, near Fredericton, and Village Acadien, at Caraquet, are popular outdoor museums. Leading art galleries are maintained by Mt. Allison University and the

Université de Moncton. The Beaverbrook Art Gallery in Fredericton contains the collection of the late British newspaper publisher William Maxwell Aitken, Lord Beaverbrook (q.v.).

THE ECONOMY

The economic activities of New Brunswick are diversified, but the wealth of the province is derived primarily from forest products, fishing, and mineral production. The power resources of New Brunswick are important to the economy. In the mid-1970's electric power in New Brunswick had an annual installed generating capacity of 1,332,484 kw. Of this, 652,609 kw were thermal power and the remaining 679,875 kw were derived from hydroelectric installations.

To meet the rising demand for electricity the New Brunswick Electric Power Commission completed in 1977 the largest thermal generating station in Atlantic Canada. The 1,000,000-kw Coleson Cave Generating Station almost doubled the installed capacity of the province's power utility. The Point Lepreau nuclear power plant, under construction in the late 1970's, would provide an additional 630,000 kw.

Manufacturing. According to the latest government statistics, in the mid-1970's about 29,000 production workers were employed in the province. The largest groups worked in the food and beverage industries, in the paper and allied industries, and in the wood industries; almost one fourth worked in the Saint John metropolitan area. The value of shipments in the food and beverage industries totaled about \$482,220,000; in the paper and allied industries, nearly \$463,344,000, more than double the annual value earlier in the decade; and in the wood industries, about \$114,341,000.

Agriculture. Fertile soils are confined largely to the river valleys, particularly that of the St. John R., and to the reclaimed land along the coast. According to the 1976 census, there were 3244 farms covering some 994,174 acres and averaging 306 acres each. New Brunswick led all provinces in output of potatoes in 1975 and 1976, and livestock raising is also important. Cash receipts from farming operations in 1975 totaled about \$100,000,000.

Fishing. Commercial fishing is an important basic industry of New Brunswick. The primary fishing industry employed about 5000 people in the early 1970's, and the annual value of all fishery products was about \$116,000,000 in the mid-1970's. Lobster is the major species taken; herring is second and tuna a close third.

Mining. Mineral production in New Brunswick was valued at about \$232,000,000 per year in the mid-1970's. The most important mineral

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products are copper, lead, silver, and zinc. In the mid-1970's New Brunswick ranked second in the nation in output of zinc and fourth in production of lead and silver. The annual value of production of metallics totaled about \$197,000,000; structural materials were valued at about \$24,000,000, fuels at about \$6,400,000.

Forestry. Half of the nearly 25,000 sq.mi. of forest land in New Brunswick is privately owned. The province's stand of timber is estimated at more than 20,448 million cu.ft., 80 percent of which is softwood. The annual volume of wood cut in the mid-1970's was more than 243,900,000 cu.ft., according to the latest government statistics. The value of manufacture of all shipments of sawmills and planing mills was about \$75,000,000.

Tourism. In the mid-1970's New Brunswick was visited annually by some 4,000,000 persons, who spent about \$140,000,000 each year. Main attractions include Campobello Island within the Fundy Isles, Fundy National Park, Mactaquac Provincial Park, and the numerous beaches along the seacoast. Thousands of sport fishermen come to New Brunswick each year to fish for Atlantic salmon. This great game fish is found in the Miramichi, Restigouche, and other rivers of the province.

Transportation. New Brunswick is served by the Canadian National and Canadian Pacific

railways. These lines connect in the w. with the Bangor & Aroostook and the Maine Central railroads. The province has about 14,000 mi. of roads, of which about 6500 mi. are paved; the remainder is graveled. Free ferries are available at river crossings without bridges, and ferry service is provided between coastal towns and Grand Manan and Campobello islands. Saint John, Moncton, and Fredericton have scheduled airline service.

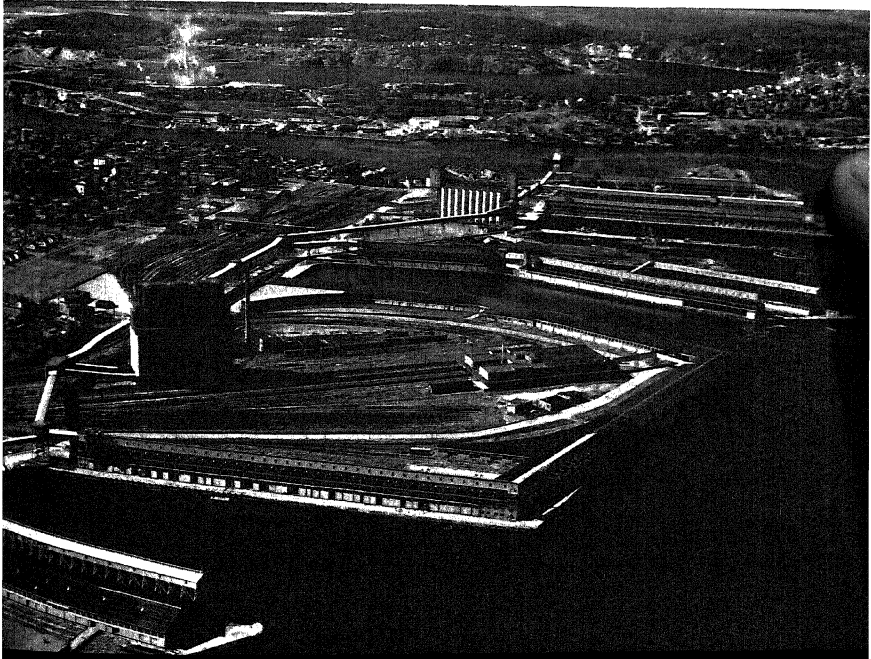
Communications. In the mid-1970's nearly 332,000 telephones were in use, or about 49 per 100 persons. The province is served by 14 radio stations, of which 10 are privately owned and 4 are owned by the Canadian Broadcasting Corporation (C.B.C.). One station broadcasts in the French language, one is bilingual, and the C.B.C. International Service broadcasts in several languages from its station at Sackville. The province is served by 3 television stations, 1 of which broadcasts in French. New Brunswick has 6 daily newspapers, 1 of which is in French, and 19 weekly newspapers, 5 of which are in French or bilingual.

GOVERNMENT

New Brunswick is represented in the Canadian government at Ottawa by ten senators who are appointed until age seventy-five and by ten

Aerial view of the harbor at Saint John, the chief seaport of New Brunswick.

National Film Board of Canada



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members of the House of Commons who are elected for a maximum period of five years.

The provincial government has legislative and executive powers as defined by the British North America Act (q.v.) of 1867 (see CANADA: *Government*). Other rights derive from custom and usage established as the British parliamentary system evolved or from legislation enacted by the British, Canadian, and New Brunswick parliaments since confederation. Two political parties, the Liberal and Progressive Conservative, have held power in New Brunswick; a third party has never formed a government in the province.

The British monarch is represented by a lieutenant governor, who acts on the advice of the executive council, which is responsible to a single legislative body, the legislative assembly. The assembly has fifty-eight members elected for a maximum period of five years. The government is headed by a premier, who is the leader of the majority party. Cabinet ministers are selected from the assembly and head the departments of government. The ministers and the premier make up the executive council.

The provincial judiciary is headed by a Supreme Court with two divisions: appeal division and Queen's Bench, or trial, division. The judges of the provincial court, divided into criminal and family courts, and of the county court, which has fifteen branches, deal with cases of lesser magnitude or of regional concern. Each county court judge has jurisdiction over two or more counties. Magistrates at the municipal level have limited civil and criminal jurisdiction. Special courts deal with admiralty and probate cases. Bankruptcy matters are heard by the supreme court, Queen's Bench division. All Supreme Court and county court judges are appointed by the governor-general of Canada on advice of his Cabinet. All provincial court judges and judges of probate are appointed by the lieutenant-governor in council.

Local Government. The province is divided into fifteen counties. The cities, towns, and villages are administered by elected mayors and councillors.

Voting Qualifications. Canadian citizens eighteen years of age or over, with minor exceptions and subject to prior residence requirements, may vote in Federal elections. Voting in provincial or municipal elections requires attainment of age eighteen, status as a Canadian citizen or British subject, and residence in the province for six months (for provincial elections) or in the municipality for six months (municipal elections).

HISTORY

The French mariner Jacques Cartier (q.v.) explored the east coast of the region comprising present-day New Brunswick in 1534. He and other early explorers found two Indian tribes in the region, the Malecite and the Micmac.

In 1604 the French explorers Samuel de Champlain and Pierre du Guast Monts (qq.v.) established the first French settlement on an island at the mouth of the Saint Croix R. The settlement was abandoned the next year, but after 1631, when the French constructed Fort La Tour on the site of modern Saint John, colonists moved into the coastal area along the Bay of Fundy. The New Brunswick region then formed part of the French province of Acadia (q.v.). Warfare between the French and British flared intermittently between 1689 and 1763. Great Britain obtained possession of Acadia in 1713 under the terms of the Peace of Utrecht, the agreement ending the War of the Spanish Succession, but the French insisted that New Brunswick was not included in the cession. In 1755 the British defeated French forces at Fort Beauséjour and extended effective British rule to New Brunswick. In the same year, when the British expelled the Acadians from Nova Scotia, some 500 of the deportees settled in New Brunswick, substantially augmenting its population. In 1762 the first British settlement in New Brunswick was established at Saint John. Many British loyalists fled from American colonies during and after the American Revolution (q.v.), and in 1784 New Brunswick, which had been administered as a part of Nova Scotia, became a separate colony.

After the Napoleonic Wars many British immigrants came to New Brunswick, and the colony entered upon a period of prosperity based on fishing, shipbuilding, and lumbering. In 1867 New Brunswick joined with Nova Scotia, Lower Canada (Québec), and Upper Canada (Ontario) to form the Dominion of Canada under the terms of the British North America Act.

A period of railroad building followed confederation. The Intercolonial Railway (now the Canadian National Railway), linking New Brunswick and Nova Scotia with Montréal, was completed in 1876. The Canadian Pacific Railway line from Montréal to Moncton, by way of northern Maine, was finished before the close of the century. Other local lines were built, some before confederation.

Agriculture and the timber trade declined in the late 19th century. Factors involved were the opening up of the western grain country, the industrialization of central Canada, and tariff restrictions that cut New Brunswick off from its

natural trade channels to the United States and Europe. The long freight haul to the central Canadian markets inhibited trade in that direction.

The 20th century has witnessed a slow recovery of the provincial economy. The introduction of the pulp-and-paper industry brought new life and a more stable character to lumbering. Agriculture gained greatly with the cultivation of potatoes for export. The fishing industry expanded, and methods of fishing were improved. New industries appeared, particularly those aimed at supplying provincial needs. The exploitation of hydroelectric resources, mining discoveries, and the general growth of Canada as a whole helped to improve economic conditions.

The government of Liberal Premier Louis J. Robichaud (1925–), who took office in 1960, culminated in the passage in 1969 of the Official Languages Act. Under the act, French was given co-equal status with English, and all government and civil-service functions were to be conducted in both languages. Robichaud was himself an Acadian.

In 1970 Progressive Conservative Party leader Richard Bennett Hatfield (1931–) was elected premier, replacing Robichaud. Hatfield, who was reelected in 1975, sought to promote the industrial development of the province, and a number of new factories were opened. The province's first nuclear power station was started on the Bay of Fundy near Saint John; it was scheduled for completion in 1980. A new government-backed automobile manufacturing plant in Saint John failed, however, with considerable financial loss to the province.

The economic situation worsened in 1972 when the Federal government decided to impose a five-year ban on commercial salmon fishing in New Brunswick and other provinces where the stocks had become dangerously depleted. There was widespread unemployment, particularly among the Acadian fishermen in the N.E. part of the province. In addition, the lumbering industry went into a slump as orders for its products declined.

The port of Saint John was the strongest factor in the provincial economy. A new container terminal was constructed, giving the port preeminence over Halifax, N.S., in that type of shipping; and several important contracts were secured for the building of oil tankers for foreign firms. In the late 1970's Saint John's prosperity seemed destined to continue, as proposals for the establishment of a liquid natural gas terminal were being actively discussed.

NEWBURGH, city of New York, in Orange Co., on the w. bank of the Hudson R., opposite Beacon. Newburgh is a manufacturing center, trading center, and shipping port. The principal industries are the manufacture of textiles, rugs, tiles, and pharmaceuticals; the city also has shipyards. Hasbrouck House (now a State museum) served as the headquarters of General George Washington (q.v.) from April, 1782, to August, 1783; and it was in Newburgh that Washington disbanded the Continental Army. The city later was a whaling port. It was settled in 1709 by Germans, resettled in 1752 by British and Scottish colonists, and incorporated as a city in 1865. Pop. (1960) 30,979; (1970) 26,219.

NEWBURYPORT, city in Massachusetts, and one of the county seats of Essex Co., at the mouth of the Merrimack R., 38 miles N.E. of Boston. The major manufactures include electrical machinery, leather goods, and clothing. The city is noted for many beautiful shade trees and historic homes. The site of the present city was first settled in 1635. Newburyport was incorporated as a town in 1764 and chartered as a city in 1851. In the 18th century and the early part of the 19th century, Newburyport was a shipbuilding, whaling, and fishing center, with an extensive trade with the West Indies. It was especially noted for the building of clipper ships. Pop. (1970) 15,807.

NEW CALEDONIA AND DEPENDENCIES, overseas territory of France, situated in the Southwest Pacific Ocean, about 875 miles E. of Australia, and comprising the island of New Caledonia and a number of smaller islands and island groups. The territory lies between about lat. 20° S. and lat. 23° S. and long. 164° E. and long. 167° E. The dependencies include the Loyalty Islands, 60 miles E. of New Caledonia, the Isle of Pines, 30 miles S.E., the Chesterfield Islands, 340 miles W., and the Huon Islands, 170 miles N.W. The total area is about 7756 sq.mi. The population (census 1963) was 86,519; the United Nations estimated (1974) 130,000. The population includes more than 47,000 Melanesians, 32,000 Europeans (mainly French), and some Vietnamese, Polynesians, and Indonesians. The overall population density is about 15 per sq.mi. (U.N. est. 1973). The capital of the territory and its largest city is Nouméa (pop., 1971 est., 49,315).

The economy of New Caledonia is based on a variety of resources: agricultural (coffee, coconut palms, and food crops); stock raising; fishing and forestry; and, most important, mining (especially nickel and iron). Annual production of nickel ore in the early 1970's was about 138,000 tons, and of iron about 90,000 tons.

NEWCASTLE

Local industries, mainly food processing and metallurgy, are being developed. Principal exports are minerals, refined nickel, coffee, copra, and preserved meats. Chief imports are petroleum products, coal, and coke. The unit of currency is the CFP franc, consisting of 100 centimes (1 CFP franc equals U.S.\$0.130; 1973).

The land is divided into native reserves owned by the tribal groups, private estates, and public lands, some of which are owned by the territorial government and some by the French government. The territory is administered by a governor aided by a council and an elected assembly.

NEWCASTLE, name of a dukedom in the English peerage held by members of the Cavendish, Holles, Pelham, and Clinton families. In 1665 the English soldier William Cavendish (q.v.), was created duke of Newcastle. The title was recreated in 1694 for the statesman John Holles (1662–1711), and passed in 1715 to his nephew, the statesman Thomas Pelham-Holles (q.v.). In 1756 Pelham-Holles was also given the title duke of Newcastle-under-Lyme, a title that was inherited in 1768 by his nephew Henry Fiennes Clinton, 9th Earl of Lincoln (1720–94).

NEW CASTLE, city in Indiana, and county seat of Henry Co., on the Blue R., 18 miles s. of Muncie. The city is the trading center of a fertile agricultural and livestock area. The principal industries are the manufacture of automobile parts and steel products. New Castle was settled in 1822 and incorporated in 1839. Pop. (1960) 20,349; (1970) 21,215.

NEW CASTLE, city in Pennsylvania, and county seat of Lawrence Co., on the Shenango R., 43 miles n.w. of Pittsburgh. It has factories for the manufacture of automobile parts, heating equipment, and glass. Mines for the extraction of coal, clay, and limestone are found in the area, which is known for the manufacture of quality pottery. Cascade Park, a summer amusement center, is nearby. The site of New Castle was an Indian trading post. It was settled in 1798 and incorporated as a city about 1869. Pop. (1960) 44,790; (1970) 38,559.

NEWCASTLE, city of Australia, in New South Wales State, on the Tasman Sea, 75 miles n.e. of Sydney. It is the second largest city of New South Wales, the center of the largest Australian coal-mining area, and an industrial center with steel mills and shipyards. Coal, wheat, and wool are exported from the port at Newcastle. Newcastle was founded as a penal colony in 1804, became a free settlement in 1821, and received its municipal charter in 1859. Pop. (1971 est.) 351,010.

NEWCASTLE-UNDER-LYME, Great Britain, municipal borough in Staffordshire, England, on Lyme Brook in the Trent valley, 2 miles w. of Stoke-on-Trent. An old market town and an industrial and coal-mining center, it is a road hub located on a railroad. It is situated in "the Potteries", a densely populated region that has been noted since the 16th century for the production of china and pottery. Josiah Wedgwood (q.v.), Josiah Spode (1754–1827), and Thomas Minton (1765–1836), early founders of the industry, all once worked in the area. Formerly a hat-producing center, the city now manufactures steel, machinery, cotton textiles, pottery, paper, tile, leather, beer, and malt. It is the site of the 13th-century Church of Saint Giles, rebuilt in 1876. In 1932, when the limits of the borough were greatly expanded, Wolstanton, another center of coal mining and pottery production, was absorbed. The city received its first charter in 1235. It was named for a 12th-century castle and for its position under the Forest of Lyme; both features have long since disappeared. Pop. (1971) 76,595.

NEWCASTLE UPON TYNE, Great Britain, county borough of Northumberland County, England, on the n. bank of the Tyne R., 260 miles n.w. of London. Newcastle upon Tyne is a major port, particularly for the shipping of coal. It is also a center for shipbuilding and heavy industry, including the manufacture of machinery. The city has remains of 13th-century town walls, and the Cathedral of Saint Nicholas dates mainly from the 14th century. Other points of interest are Trinity Almshouse (1492), the Royal Free Grammar School (1525), and the University of Newcastle upon Tyne (1851). The city is on the site of *Pons Aelii*, one of the Roman forts along Hadrian's Wall (q.v.). The site was later occupied by the Angles (q.v.), and was probably called Monkchester or Monk Chester, because of the location there of a monastic settlement. The city took the present name from a castle first built in 1080, although the surviving remains date from 1177. Pop. (1971) 222,153.

NEWCOMEN, Thomas (1663–1729), English blacksmith and inventor, born in Dartmouth, Devonshire. In 1698 he went into partnership with the English engineer Thomas Savery (1650?–1715) who had already built a steam engine and obtained several patents. Newcomen attempted to produce a reliable steam engine, and in 1705 successfully devised an atmospheric steam engine with another English inventor, John Calley (d. 1725), also known as John Cawley. The engine, which did not require high-pressure steam, was widely adopted for



A 1934 poster of the National Recovery Administration, set up under the New Deal to aid industry. UPI

water pumping in most of Europe and was further improved by Newcomen in 1725.

Newcomen's engine was introduced in North America about 1755. It remained basically unchanged until 1769 when the British engineer and inventor James Watt (q.v.) invented a separate steam condenser that vastly increased the efficiency of the engine. By 1790 the Newcomen engine had been almost completely replaced by the Watt engine. See STEAM AND STEAM ENGINEERING: *Steam Engines*.

NEW DEAL, descriptive phrase for the program of Franklin Delano Roosevelt (q.v.) during his first two terms as President of the United States. The phrase is derived from Roosevelt's speech accepting the Democratic nomination for the Presidency in 1932, in which he pledged himself to "a new deal for the American people". The New Deal consisted of two main parts. The first included temporary measures designed to provide relief and to counteract the effects of the economic depression that had begun in 1929. The second included permanent measures designed to rehabilitate and stabilize the national economy to prevent the recurrence of severe economic dislocations.

Among the temporary measures adopted were the passage of the Emergency Banking Act by a special session of Congress on March 9, 1933, to prevent the breakdown of the national banking system; the passage of legislation, on March 31, instituting Emergency Conservation Work, succeeded in 1937 by creation of the Ci-

vilian Conservation Corps (q.v.), by which young workers were employed in forest and soil conservation projects; the creation of the Federal Emergency Relief Administration on May 12, to supplement State relief funds for distribution to needy individuals; and the establishment, on May 6, 1935, of the Works Progress Administration or as later known, the Work Projects Administration (q.v.), to create jobs for the unemployed.

The measures of the New Deal that were intended to be permanent included the Agricultural Adjustment Act, passed on May 12, 1933, and the National Industrial Recovery Act (q.v.), passed on June 16, which established the National Recovery Administration. These acts were designed for the economic recovery of farmers and industrial employees, respectively. Other measures were the creation of the Tennessee Valley Authority (q.v.) in May, 1933, providing for the conservation of resources and subsequent economic and social improvement of seven Southern States; the Securities Act of 1933 and the Securities and Exchange Act of 1934 (see SECURITIES AND EXCHANGE COMMISSION); the National Housing Act of 1934 (see HOUSING: *Early Federal Aid to Housing*); the National Labor Relations Act (q.v.) of 1935; the Social Security Act of 1935 (see SOCIAL SECURITY); the establishment of the Rural Electrification Administration (q.v.) in 1936; and the Fair Labor Standards Act (q.v.), passed in June, 1938.

The New Deal was attacked by conservatives as being destructive of private enterprise and individual initiative; it was defended by agrarian, labor, and liberal groups as a balancing reform program for eliminating severe economic depressions. Many scholars now believe that the New Deal helped to introduce into the U.S. a widely held attitude that governmental regulation of a free economy was justified, to whatever extent necessary, in order to satisfy the minimum needs of public welfare and continuous employment.

See also UNITED STATES OF AMERICA: *History*.

NEW DELHI, city and capital of the Republic of India, in the Union Territory of New Delhi, on the Jumna R., about 110 miles N.W. of Agra. New Delhi was built between 1912 and 1929 on a site about 3 miles S.E. of Delhi (q.v.), or Old Delhi, which had been chosen to replace Calcutta as the capital of India in 1911; New Delhi was inaugurated as the new capital in 1931. Predominantly an administrative center, the city also has textile mills, printing plants, and light manufacturing establishments. The streets of New Delhi are laid out symmetrically, according

to the city plan drawn by the British architect Sir Edwin Landseer Lutyens (1869–1944). Lutyens also designed the majestic red sandstone and marble Rashtrapati Bhawan, formerly the palace of the viceroy and now the residence of the president, which is in the center of the city, as are the parliamentary and other important government buildings; the architecture of these buildings is mainly European, with details of indigenous Indian styles. Another building that combines Indian and Western styles is the notable United States embassy designed by the American architect Edward Durrell Stone (q.v.). The Raj Path, a wide boulevard bordered by trees and canals, runs e. from the palace to a war memorial arch. The streets of the commercial center, Connaught Place, 1 mile n.e. of the palace, are laid out in a radial pattern.

A number of institutions for higher education and research, including the National Museum, are located near the city. A prayer ground in the southern section of New Delhi was the scene of the assassination of Mohandas Karamchand Gandhi (q.v.) in 1948. The Balmiki and Lakshminarayan temples, which he often visited, are in the city's western sector. Pop. (1971) 301,801.

NEWELL, Homer Edward (1915–), American mathematician and physicist, born in Holyoke, Mass., and educated at Harvard University and the University of Wisconsin. Newell taught mathematics at the University of Maryland from 1940 to 1944, when he joined the staff of the Naval Research Laboratory in Washington, D.C. From 1952 to 1953 he headed the laboratory's Rocket-Sonde Research Branch, and from 1955 to 1958 he was superintendent of the Atmosphere and Astrophysics Division, engaged in the earth-satellite project. Newell joined the National Aeronautics and Space Administration (q.v.) in 1958. He worked in the Office of Space Scientists (1958–63) as director for the last two years, was associate administrator for space science and applications (1963–67), and became associate administrator of NASA in 1967.

Newell is an expert in high-altitude rocket research. Studies under his direction contributed greatly to knowledge of stratospheric densities and pressures and produced much information on cosmic and solar radiation; see also **ASTRONAUTICS**. He is the author of several books and articles in his field, including *High Altitude Rocket Research* (1953), *Space Book for Young People* (1958; rev. ed. 1968), and *Express to the Stars* (1961).

NEW ENGLAND, collective name given to the six northeastern States of the United States of America, namely Maine, New Hampshire, Ver-

mont, Massachusetts, Rhode Island, and Connecticut (qq.v.). The region is bordered on the e. and s. by the Atlantic Ocean and Long Island Sound and the land rises in the n. and w. to the New England system of the Appalachian Mts. (q.v.). The coast is the most important commercial area, although during the 20th century industry and tourism have largely superseded the traditionally important activities of fishing and shipbuilding. The major events of the American Revolution (q.v.) took place in New England.

See also **COLONIAL LIFE IN NORTH AMERICA**.

NEW ENGLAND CONFEDERATION, military alliance formed in 1643 by the American colonies of Massachusetts Bay, Connecticut, New Haven, and Plymouth. Members agreed to coordinate their military operations, while retaining their independence in internal affairs. Achievement of the aims of the alliance was hampered by the development of bitter rivalries among the signatories. Massachusetts Bay Colony, for example, attempted to win a predominant position within the Confederation on the grounds that it had the largest population; failing in this attempt, the colony refused in 1653 to participate in a projected war against the Dutch colonies in America. The major achievement of the Confederation was the successful cooperation of the members in King Philip's War (1675–76), in which the colonies crushed an uprising among the Indian tribes of southern New England; see **PHILIP**, sachem of Wampanoag tribe. In 1684, shortly after the charter of Massachusetts Bay Colony had been revoked by the English government (see **MASSACHUSETTS: History**), the Confederation was dissolved.

NEWFOUNDLAND, most easterly province of Canada, consisting of the island of Newfoundland and, on the mainland, Labrador (q.v.). Newfoundland (43,359 sq.mi.) is situated off the e. coast of North America, between the Gulf of Saint Lawrence (see **SAINT LAWRENCE, GULF OF**) and the Atlantic Ocean. Labrador (112,826 sq.mi.) is separated from Newfoundland by the Strait of Belle Isle. The area of the entire province is 156,185 sq.mi.

THE LAND

Labrador is roughly triangular in shape and is bounded on the n. and e. by the Atlantic Ocean and on the s. and w. by the province of Québec. The rugged coastline of Labrador is much indented with long fjords and has promontories rising abruptly to 3000 ft. The extreme n. area of Labrador is dominated by the Torngat Mts., which include Cirque Mt. (5160 ft.), the highest peak in the province. Elevations average 1000 to 2000 ft. along the s. border.



The waterfront section of St. John's, the capital of Newfoundland.
Canadian Govt. Office of Tourism

The remainder of the province is the island of Newfoundland, which is also shaped somewhat like an equilateral triangle with sides about 320 mi. long. The coastline is extremely irregular and rimmed with rocky cliffs from 200 to 400 ft. high. Many large bays and sheltered inlets, studded with islands, extend far inland. In the s.e., between Trinity and Placentia bays, is the low-lying Avalon Peninsula, the most densely populated part of Newfoundland. The interior of the island is a low, rolling plateau that rises toward the w.; the average elevation is about 700 ft. The island is traversed by parallel ridges trending n.e. to s.w. The Long Range, which lies along the w. coast, is the highest of these ridges; it reaches an extreme elevation of 2672 ft. near Corner Brook. Much of the surface of Newfoundland resembles that of Labrador and is barren and rocky, with numerous ponds and swamps.

Rivers and Lakes. The most important river of the province is the Churchill R. (q.v.), which drains several large lakes in w. Labrador and flows into the Atlantic Ocean via Lake Melville and Hamilton Inlet. At one point the Churchill drops 1000 ft. in a 16-mi. stretch. At Churchill Falls (q.v.) one of Canada's biggest hydroelectric projects was completed in the mid-1970's.

Among Labrador's other rivers, the Naskaupi R., which connects Smallwood Reservoir with Lake Melville, is the longest. Smallwood Reservoir was formed by water backing up from the dams of the Churchill Falls project. Lobstick Lake and Michikamau Lake, once separate bodies of water, were drowned by the reservoir.

The longest river on the island of Newfoundland is the Exploits R. (153 mi.), which flows

through the center of the island and empties into Notre Dame Bay on the n. shore. The Gander R. (102 mi.), in the s.e., flows through Gander Lake and empties into Hamilton Sound. The Humber R. (75 mi.), in the w. part of the island, flows s. from Deer Lake and empties into the Bay of Islands at Corner Brook.

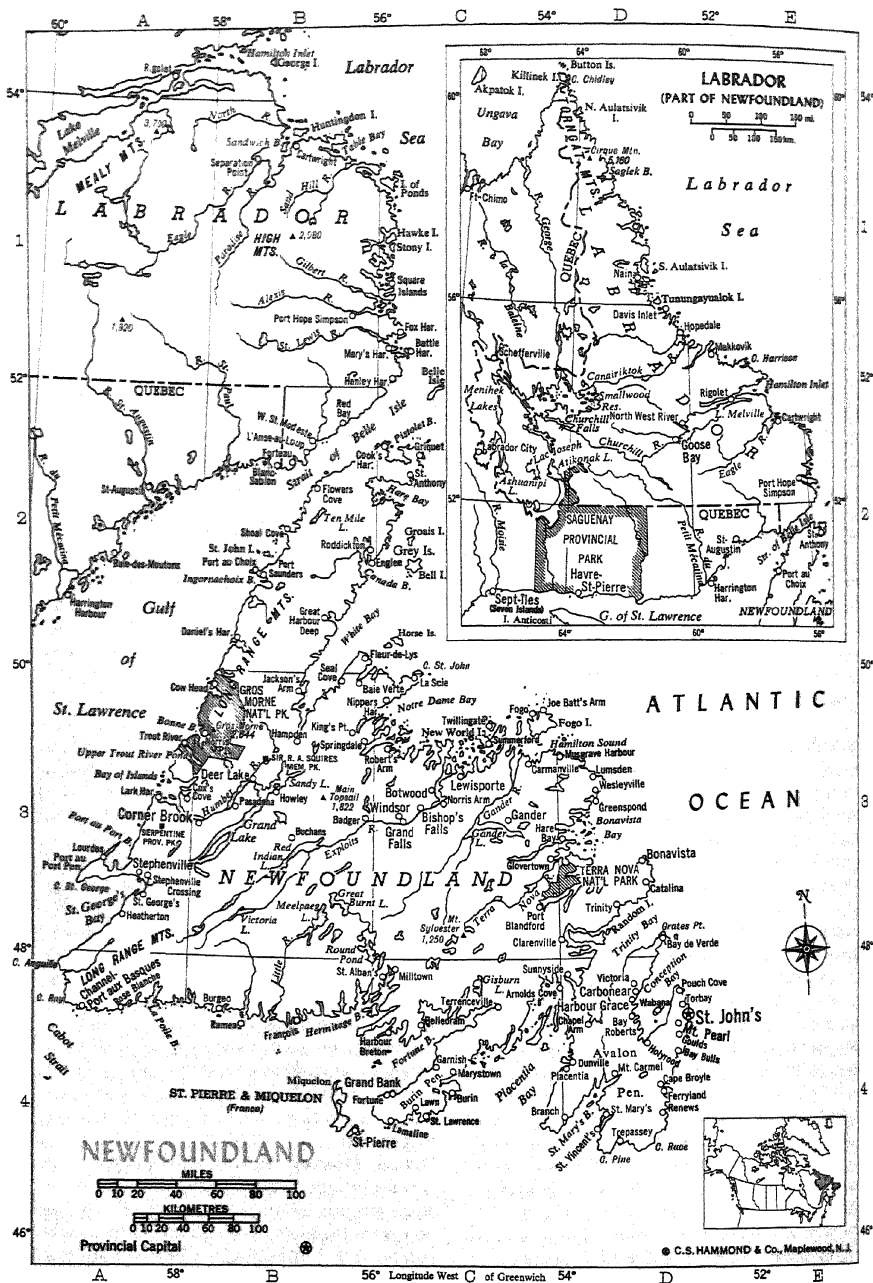
Climate. The climate of the province is cool and damp. It is strongly influenced by cold air coming off the Labrador Current (q.v.), which flows along the coasts of both Labrador and Newfoundland. The island experiences frequent storms, some with very high winds.

January mean temperatures on the island are generally above 20° F., but in the interior of Labrador the January mean is around -15° F. Precipitation is less than 20 in. per year in Labrador, but the island receives heavy precipitation the year round, averaging some 50 in. In winter snowfall on the island is quite heavy—more than 100 in. in many places.

The summer is relatively brief; July mean temperatures range from about 60° F. on the island to around 40° F. in n. Labrador. In s.e. Newfoundland and adjacent waters heavy fogs occur in summer.

Plants. Most of Labrador and about half of Newfoundland are well forested. The most abundant species are black spruce and balsam fir. On the island there are mixed deciduous forests of birch and maple, and extensive regions of scrubby growth or open barrens, in which mosses, lichens, wild flowers, and berry bushes abound.

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		Trepassey	D 4	Joseph (lake)	C 2	White (bay)	B 3

Animals. Moose and caribou are the most abundant big game animals in Newfoundland and Labrador. Black bear are also numerous, and there are significant numbers of furbearing animals such as mink, otter, and beaver, as well as the seals that are hunted off the coast every spring. Newfoundland has two sanctuaries for sea birds; at Cape Saint Mary's is the second largest colony of gannets in North America.

Parks and Other Places of Interest. Newfoundland has two national parks, one large wilderness area, and numerous provincial parks and beaches. Terra Nova National Park, on the e. coast, includes forest country near Bonavista Bay, where icebergs are visible in spring. Gros Morne National Park, on the w. coast, includes a portion of the rugged Long Range Mountains and the spectacular scenery of Bonne Bay. An-

other place of interest is Signal Hill, a headland at the entrance to St. John's harbor that in 1762 was the site of the last armed confrontation between French and British forces in North America. It was also at Signal Hill that the Italian inventor Guglielmo Marconi received the first transatlantic wireless message, in 1901.

THE PEOPLE

According to the 1976 census the population of Newfoundland was 557,725, of which 524,673 lived on the island and 33,052 in Labrador. The island of Newfoundland is typified by scattered small settlements along the coasts or near the railroad line that crosses the interior. The communities, ranging in size from a few families to about 1000 people, have declined with the fortunes of the fishing industry; many of the people in outlying hamlets were resettled by the

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government with the aim of giving them employment in new industries.

Nearly all Newfoundlanders are descended from English and Irish settlers; a small minority is of Scottish, Channel Island, or French origin. The original Indian population, members of the Beothuck tribe, died out by 1829; the present Indian population is about 1200, mostly of the Micmac (q.v.) tribe, which originally came from Nova Scotia.

The population of Labrador consists predominantly of Newfoundlanders of British stock and French Canadians. A small number of Eskimo (Inuit) live along the coast, and some Naskapi and Montagnais Indians live in the interior.

Newfoundland has two cities, St. John's (q.v.) and Corner Brook. The capital, St. John's, situated on a fine harbor, is the oldest official settlement in Newfoundland. The principal towns on the island are Mount Pearl, a suburb of St. John's; Gander in the N.E.; Stephenville on the W. coast; Grand Falls and Windsor in the central region; Channel-Port-aux-Basques in the S.W.; Carbonear, across Conception Bay from St. John's; and Wabana, on Belle Isle in the middle of the bay.

Happy Valley is the only incorporated town in Labrador. The combined Happy Valley-Goose Bay population is exceeded only by that of the iron mining district around Labrador City on the W. border with Québec.

Education and Cultural Facilities. The geographical and economic circumstances of the province, which favored the establishment of self-sufficient outposts of settlers, resulted in the development of an educational system that is predominantly denominational. Most areas, however, now have a School Tax Authority that assesses area residents on a per capita basis. School attendance is free and compulsory for children under 15 years of age.

ELEMENTARY AND SECONDARY SCHOOLS. According to the latest government estimates, in the late 1970's there were more than 700 public and private elementary and secondary schools (exclusive of private kindergartens) that were attended annually by about 158,000 students; full-time teachers totaled nearly 8000.

UNIVERSITIES AND COLLEGES. Memorial University of Newfoundland, at St. John's, is the only degree-granting institution in the province; it has an annual enrollment of about 9000 students. Memorial University Regional College, on the W. coast of the island, offers first- and second-year programs to about 400 students. Including two other institutions of higher education, the total enrollment beyond high school

was estimated at about 13,000 in the late 1970's; there were more than 1000 full-time teachers. **LIBRARIES AND MUSEUMS.** Newfoundland's public library system consists of three regions with a total of 100 libraries; there is also a mobile library serving isolated areas. The headquarters of the system is A. C. Hunter Memorial Library in St. John's. Also in St. John's is the largest academic library in the province as well as the Newfoundland Museum.

THE ECONOMY

Newfoundland's economy is diversified, but is dominated by mining, forestry, and fishing. There are a number of manufacturing plants, principally engaged in processing wood and fish products. The development of hydroelectric power has played a key role in the economic resurgence of the province. Mainly by virtue of the huge generating plant at Churchill Falls in Labrador, which has an installed capacity of 5,225,000 kw, Newfoundland generates roughly 10 percent of all electric power in Canada.

Manufacturing. In the mid-1970's about 15,000 workers were employed in primary manufacturing. In order of numbers of workers the main industries were fish products, pulp and paper mills, bakeries, soft drink bottlers, and dairies. There were also two oil refineries and a steel mill. The value of shipments in the food and beverage industries was about \$175,251,000 per year; the annual value of shipments for all manufacturing in Newfoundland was about \$650,000,000.

Agriculture. Agriculture plays a relatively minor role in the economy of Newfoundland, and most agricultural production is for domestic consumption. In the mid-1970's the total value of agricultural products sold in the province was about \$20,356,000 annually. The most valuable products were eggs (\$5,500,000), vegetables (\$4,900,000), broiler chickens (\$3,500,000), hogs (\$3,120,000), and dairy products (\$2,721,000). There was also some fur trapping. Newfoundland has about 800 farms covering some 80,000 acres; the average size of a farm is 100 acres.

Fishing. Fishing was the economic way of life of Newfoundland for more than 400 years; its Atlantic fisheries were what drew the first Europeans to Canada. Although much diminished in scale in the 20th century, fishing has become more diversified. Cod, the traditional staple, has remained the most important catch, but is now supplemented by herring, lobster, salmon, sole, and flounder. In the mid-1970's about 20,000 people were employed in commercial fishing; the landed value of the catch was about \$64,716,000 yearly.

Mining. The value of minerals mined in Newfoundland steadily increased during the 1970's. By the second half of the decade it had reached \$750,000,000. Iron ore accounted for almost \$650,000,000 of the total. The most important iron mines are in W. Labrador in the Carol Lake/Wabush district and near Labrador City. The mines at Schefferville are on the border with the province of Québec. Labrador is Canada's leading producer of iron ore. Labrador and Québec combined produce about three fourths of the iron in Canada.

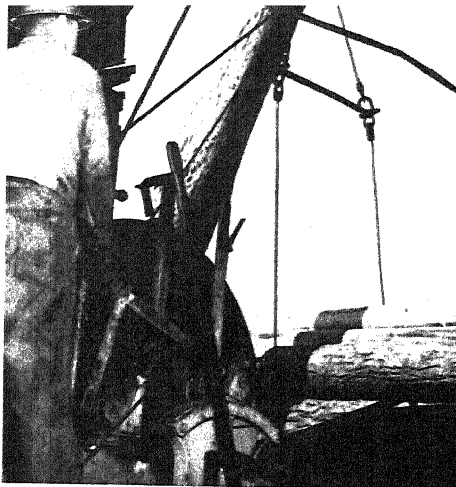
Newfoundland also produces important quantities of lead, zinc, and asbestos, and is Canada's only producer of fluorspar, a mineral crucial to the manufacture of aluminum.

Forestry. Forests are among the most important economic resources of Newfoundland. There are more than 60,000 sq.mi. of forest, of which over 33,000 sq.mi. are productive. The principal commercially important stands are balsam fir, spruce, and to a much lesser extent, white birch. Merchantable timber resources in Newfoundland and Labrador have been estimated to be in excess of 21.7 billion cu.ft., the vast majority being softwoods. Annual production totals more than 100,000,000 cu.ft., with a manufactured value of more than \$75,000,000. About 2000 people are employed in primary logging operations.

Tourism. The economy of Newfoundland profits from tourism. In the mid-1970's the province was visited annually by more than 580,000 persons who spent about \$41,000,000 each year. Main tourist attractions include the provincial and national parks, the city of St. John's, and sport fishing in Newfoundland's waters.

Transportation. Railroad track in Newfoundland totaled about 1078 mi. in the mid-1970's. Improved and unimproved roads and highways totaled about 1177 mi., including the Newfoundland section of the Trans-Canada Highway, which runs for 575 mi. from Channel-Port-aux-Basques to St. John's. Ferry service is available between Newfoundland and the mainland of Canada. The usual means of travel between coastal villages has been by small boat or steamer, although the construction of new roads has changed this somewhat. The major port in Newfoundland is St. John's. Newfoundland is the easternmost point in North America except for Greenland and is a key terminal for transatlantic air travel. The international airport at Gander serves about 350,000 passengers yearly.

Communications. Newfoundland has been the North American terminus of transatlantic cables since the first cable was laid in 1866. It was



Forestry is one of the economic mainstays of the island of Newfoundland.
National Film Board of Canada

also the site of the first wireless signal station to receive messages across the ocean. Radio and electronic aids to navigation operating in Newfoundland remain vital to the safety of North Atlantic sea and air travel. Radio and television stations broadcast throughout the province. In the mid-1970's Newfoundland had 3 daily newspapers and about 15 weeklies.

J.L.R.

GOVERNMENT

Newfoundland became a province of Canada in 1949, and its government is essentially the same as that of the other Canadian provinces. Newfoundland has a lieutenant governor, appointed by the Federal government at Ottawa, and a legislative assembly with fifty-one members who are elected for a maximum term of five years. The province is represented in the national parliament by six senators and six members of the House of Commons.

The judicial system of Newfoundland is headed by a supreme court comprising a chief justice and two other justices. Lower courts include two district courts, a family court, and magistrates' courts.

Local Government. Newfoundland has 301 incorporated areas comprising 2 cities, 117 towns, 12 rural districts, 34 local improvement districts, 135 local government communities, and 1 metropolitan area. The towns, rural districts, and local improvement districts operate under the Local Government Act; towns and rural districts have elected councils, and local improvement districts have appointed trustees. Local government communities are established under the Community Councils Act in the smaller settlements and have limited powers and functions. The St. John's Metropolitan Area,

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incorporated under a special act, covers the area adjoining and surrounding the city of St. John's and the town of Mount Pearl and is similar in organization to a local improvement district. There are no rural municipalities in the usual sense. Only about one fifth of 1 percent of the total area is municipally organized. Municipalities are supervised by the Department of Municipal Affairs and Housing.

Voting Qualifications. The right to vote in Federal elections is accorded to all Canadian citizens over eighteen years of age. In provincial elections the voting age is eighteen years, and voters must be local residents and taxpayers.

HISTORY

Newfoundland and Labrador were first discovered by Norse explorers about 1000 A.D. Remains of a settlement at L'Anse-au-Meadow were uncovered in 1963; they are believed to have been of Norse origin; see NORSEMEN. The area was visited in 1497 by the Italian-born explorer John Cabot (see under CABOT), sailing under the English flag, and by the Portuguese navigator Gaspar Corte-Real (q.v.) around 1500. Giovanni da Verrazano (q.v.), a Florentine navigator, explored the region in 1524, and the French explorer Jacques Cartier (q.v.) visited the island in 1534.

Disputed Ownership. Following Cabot's landfall England made no immediate attempt at colonization, but during the 16th century the coastal waters of the island attracted increasing numbers of French, English, and Spanish fishermen. In 1583 Sir Humphrey Gilbert (q.v.) took formal possession of Newfoundland in the name of England. A colony, which became St. John's, was established in 1610 on the Avalon Peninsula. During the 17th century France also acquired a foothold on the island, establishing a base of operations on the shores of Placentia Bay. French forces sacked and burned most of the English settlements on the island at one time or another, and for a while seemed to have the upper hand.

In 1713, however, British sovereignty over Newfoundland was recognized by the Peace of Utrecht (q.v.). France retained only the islands of Saint Pierre and Miquelon, off the south coast, and cod fisheries on the west coast. Labrador became a British possession in 1763 under the terms of the Treaty of Paris, but was transferred to Québec in 1774. It became part of Newfoundland in 1809, but the boundary with Québec remained a matter of dispute until it was settled in 1927.

Responsible Government. During the 19th century, the population of Newfoundland increased considerably as laborers from various

parts of the British Isles were brought to work in the fisheries. With this influx of settlers and the growth of towns, resentment arose among the population against the colonization restrictions of the British government, directed at keeping the island merely a fishing station, and gave impetus to a demand for self-government. In 1832 Great Britain granted the right of representative government to Newfoundland and in 1855 complete self-government, or responsible government, was established, including a legislature of two houses, a cabinet, and a governor. Mining operations were begun in 1864.

International complications concerning fishing rights were occasioned by France when that country refused to allow British colonization on the west coast because it wanted no intrusion on its exclusive fishing rights. The Newfoundland government retaliated in 1888 by enacting measures which, in effect, prohibited sale of bait to French fishermen. This controversy was settled by an Anglo-French convention in 1904, by which France surrendered the west-coast rights in return for the Los Islands and other territory in Africa. Another controversy was begun in 1905-06, when the Newfoundland legislature passed acts that the United States claimed were in contravention of 1818 and 1854 treaties giving Americans fishing rights in Newfoundland waters. The question was settled by arbitration in 1910 in favor of the U.S. A third dispute, this time with Canada, and concerning the boundary of Labrador, was decided in 1927 by the British privy council. Newfoundland had owned part of Labrador since 1763, and its possession of the disputed territory (about 110,000 sq.mi.) was confirmed.

Colonization of Labrador was not undertaken until the 19th century. In 1892 the British physician Sir Wilfred Thomason Grenfell (q.v.) began his notable work as a medical missionary to the fishermen and Eskimo in Labrador.

The financial condition of Newfoundland was continually precarious and the adverse effects of the world economic depression that began in 1929 resulted in virtual bankruptcy. In 1934 the British Parliament suspended responsible government and the executive authority was vested in the governor, three Newfoundlanders, and three British commissioners, all subject to Parliamentary control. The commission worked to develop agriculture, employment opportunities, and the educational and social-welfare facilities of Newfoundland. As a result the economic condition was considerably improved. In 1941 the island became one of eight Western Hemisphere British possessions where air bases were

leased to the U.S. The presence of American soldiers and the construction of American air bases became an added factor in the economic recovery of the island. In 1946 a forty-five-member national convention was elected to investigate whether Newfoundland had accomplished its economic recovery and to ascertain the form of government desired by its people. After the investigation, completed on Jan. 31, 1948, the British government directed a referendum by which the Newfoundlanders could choose union with Canada, the restoration of self-government, or the continuation of the existing government by commission.

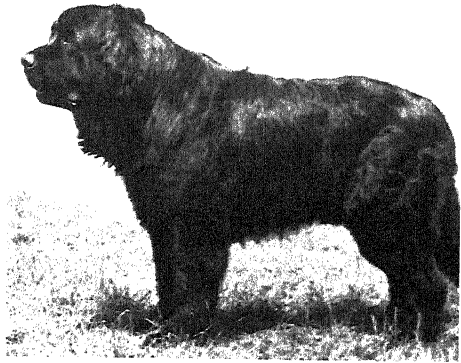
Confederation with Canada. On July 22, 1948, Newfoundland chose to unite itself with Canada by a vote of 78,323 to 71,334. On April 1, 1949, Newfoundland became the tenth Canadian province. The Liberal Party, under Premier Joseph R. Smallwood (1900–), held power in the province for twenty-three years. In 1972 the Liberal Party lost control of the assembly and a new government under Premier Frank Duff Moors (1934–) was formed by the Progressive Conservative Party, the first such administration in the history of the province.

The Smallwood regime had embarked on numerous projects intended to spur the growth of modern industry in Newfoundland. One of the more successful was the hydroelectric power development at Churchill Falls, Labrador, which began operating in 1971. By the mid-1970's the project was generating about 78 percent of the hydroelectricity produced in the province. Most of the power from the Churchill Falls project was exported from Newfoundland under an agreement with Hydro Québec. The success at Churchill Falls contrasted with the failure of a planned oil refinery at Come-by-Chance, in the upper reaches of Placentia Bay. The refinery was actually built, and began operations, only to go bankrupt.

Despite a degree of economic growth Newfoundland continues to depend heavily on the government in Ottawa for subsidies. The Moors government has been somewhat more conservative in economic matters than its predecessor. It has concerned itself mainly with the preservation of the province's fishing industry and other natural resources, in general preferring to advocate policies aimed at slower growth, which would take into account the unique social character of Newfoundland.

P.R.

NEWFOUNDLAND DOG, breed of working dog that originated in Newfoundland from the crossbreeding of native strains with foreign



Newfoundland dog

Percy T. Jones

breeds, possibly the great Pyrenees or the boarhound, brought to Newfoundland by Basque or French fishermen. Most thoroughbred Newfoundlands of today are descended from dogs bred in Great Britain from specimens imported into that country from Newfoundland. The male is about 28 in. high at the shoulder and weighs from 140 to 150 lb.; the bitch stands 26 in. high and weighs from 110 to 120 lb. The Newfoundland has a broad, massive head; small, deeply set, dark brown eyes; small ears lying close to the head; a deep chest; a flat, dense, coarse, and oily coat, usually a dull black in color, but sometimes bronze, or black and white; a strong neck; and a tail of moderate length plentifully covered with long hair. Powerful swimmers, Newfoundlands are known to have rescued human beings from drowning and to have carried lifelines from shore to ships in distress. They are employed today in Newfoundland and Labrador to draw carts and carry burdens; in the United States they are in demand principally as watchdogs and companions. Because of their loyalty, intelligence, and tractability, Newfoundland dogs are ideal pets for children.

NEW GUINEA, island in the Pacific Ocean, the second largest in the world (the first being Greenland), lying N. of Australia, from which it is separated by the Arafura Sea and, at the closest point, by the 80-mi.-wide Torres Strait. The island is situated between about lat. 1° S. and lat. 11° S. and long. 132° E. and long. 151° E. It is divided between two countries: the w. half of the island makes up the province of Irian Djaja (formerly West Irian) of the Republic of Indonesia, and the e. portion forms the bulk of the independent state of Papua New Guinea (see PAPUA). The area of the island is about 320,000 sq.mi.

NEW GUINEA

The island is generally long and narrow; its greatest width, N.W. to S.E., is about 1500 mi., and its greatest length, N. to S., is about 430 mi. A long mountain range extends from N.W. to S.E. and, in the E. portion, almost bisects Papua New Guinea; these mountains include peaks that rise to more than 16,000 ft. above sea level. The coasts are swampy and much of the interior is covered with dense rain forests thickly grown with tropical vegetation and containing ebony, sandalwood, cedar, and camphor trees. The plains in the interior are fertile, but difficulties of transportation have retarded their development. The interior also contains such minerals as gold, silver, platinum, copper, and osmiridium.

New Guinea, lying immediately S. of the equator, has a tropical, humid climate. The annual rainfall is from 30 to 230 in. The fauna is similar to that of Australia (see AUSTRALIA: *The Land: Plants and Animals*), with only a few varieties of mammals, but is notable for the many varieties of magnificently colored birds, particularly birds of paradise. The plains and coastal swamps are infested with mosquitoes.

The indigenous tribes belong to three principal groups, the Negritos, Melanesians, and Papuans. The economy of New Guinea is undeveloped, and the great majority of the people produce only enough food to satisfy immediate needs. The people subsist by hunting, fishing, and cultivating bananas, corn, manioc, sago, yams, and other crops. The island has a few large plantations, on which cacao, coffee, and copra are produced for export. The total population of New Guinea in the early 1970's was estimated to be 2,769,000.

History. The first European to see the island is

considered, by historians, to have been Antonio d'Abreu, a Portuguese navigator, in 1511, and the first to land there was the Spanish Jorge de Menezes in 1526. Another Spanish navigator, Inigo Ortiz de Retes, claimed the island for Spain in 1546 and named it Novo Guinea because he thought the natives were similar to the West African tribes. New Guinea became a calling place for many later explorers, notably the English buccaneer William Dampier, Louis Antoine de Bougainville, Comte Jean de La Pérouse, and Captain James Cook (qq.v.). The reports of these explorers as well as scientific interest in the region resulted in the exploration of the island by a number of private and governmental expeditions. In 1793 the entire island was claimed by the English East India Company. The claim was disputed by the Netherlands, and in 1828 the Dutch East India Company established a settlement and took possession of the W. half of New Guinea; see EAST INDIA COMPANY.

In 1884 the northeastern section, comprising all the territory not under British or Dutch sovereignty, was annexed by Germany. In the following year control of the region, named Kaiser Wilhelmsland, was given, under imperial charter, to the Neu-Guinea Kompagnie. The southeastern portion was taken over by Great Britain in 1884 and in 1906 was transferred to the Commonwealth of Australia as part of Papua. An Australian force occupied the German region in 1914, during World War I. In 1921 Australia received a League of Nations (q.v.) mandate over the former German colony, renamed the Territory of New Guinea (see NEW GUINEA, TERRITORY OF).

During World War II New Guinea was invaded by Japan, as a base for operations against

A portion of the Papuan fishing village of Kapa-kapa about 40 mi. east of Port Moresby, which is the capital of Papua New Guinea.

Australian News
& Information Bureau



Australia, and during the campaigns of 1942 and 1943 it became the contested perimeter of Japanese action in the South Pacific. Japanese forces took almost the entire northern portion, but in 1943 the last major Japanese attack was frustrated. A large Japanese force, however, remained in the interior until its surrender in September, 1945. In December, 1946, the Territory of New Guinea was made a trust territory of the U.N., with Australia as the administering power. The Netherlands relinquished control of the western part of the island to the U.N. on Oct. 1, 1962. On May 1, 1963, the area became part of the Republic of Indonesia as the province of West Irian (now Irian Djaja). In 1975 the eastern portion of New Guinea became independent as a part of Papua New Guinea.

NEW GUINEA, TERRITORY OF, former dependent territory of the S. Pacific Ocean, since 1975 part of the independent state of Papua New Guinea. The territory was made up of the N.E. quarter of the island of New Guinea, the Bismarck Archipelago (q.q.v.), and several smaller islands, including Bougainville (q.v.) and Buka. It was located between the equator and lat. 8° S. and between long. 141° E. and long. 165° E. The principal towns of the dependency were Lae, Wewak, and Goroka, on New Guinea, and Rabaul, on New Britain (q.v.). The population of the territory in the early 1970's was 1,795,602. Area, 92,160 sq.mi.

The N.E. coast of New Guinea was first sighted by Europeans in the early 16th century. Traders from Hamburg, Germany, became active there in the 1870's, and in 1884 Germany formally annexed the region, as well as a number of nearby islands. During World War I Australia occupied the territory, and in 1921 it received a League of Nations mandate over the country. From 1942 to 1945, during World War II, the territory was held by Japan. After the war Australia regained control, and from 1946 it administered the country as a trust territory of the United Nations. The Australians extended the export-oriented cacao, coconut, and coffee plantations established by the Germans and also fostered the commercial cultivation of pyrethrum, tea, and rubber. But the vast majority of the indigenous population were still engaged in subsistence farming when the Territory of New Guinea became independent in 1975 as a part of Papua New Guinea (see PAPUA).

NEW HAMPSHIRE, one of the New England States of the United States, bounded on the N. by the Canadian province of Québec, on the E. by Maine and the Atlantic Ocean, on the S. by Massachusetts, and on the W. by the Connecti-

cut R. New Hampshire is roughly triangular in shape, measuring about 180 mi. from N. to S. and from about 15 mi. to 90 mi. from E. to W.

Area (44th State in rank)	9304 sq. mi.
Land	9027 sq. mi.
Inland water	277 sq. mi.
Population	(1970, 41st in rank) 737,681
	(1960, 45th in rank) 606,921
	(1950) 533,242
Altitude	sea level to 6288 ft.
Capital	Concord (1970) 30,522
Largest city	Manchester (1970) 87,754
Entered Union (9th of original 13)	June 21, 1788
Nickname	The Granite State
Motto	Live Free or Die
Song	"Old New Hampshire"
Flower	purple lilac
Bird	purple finch

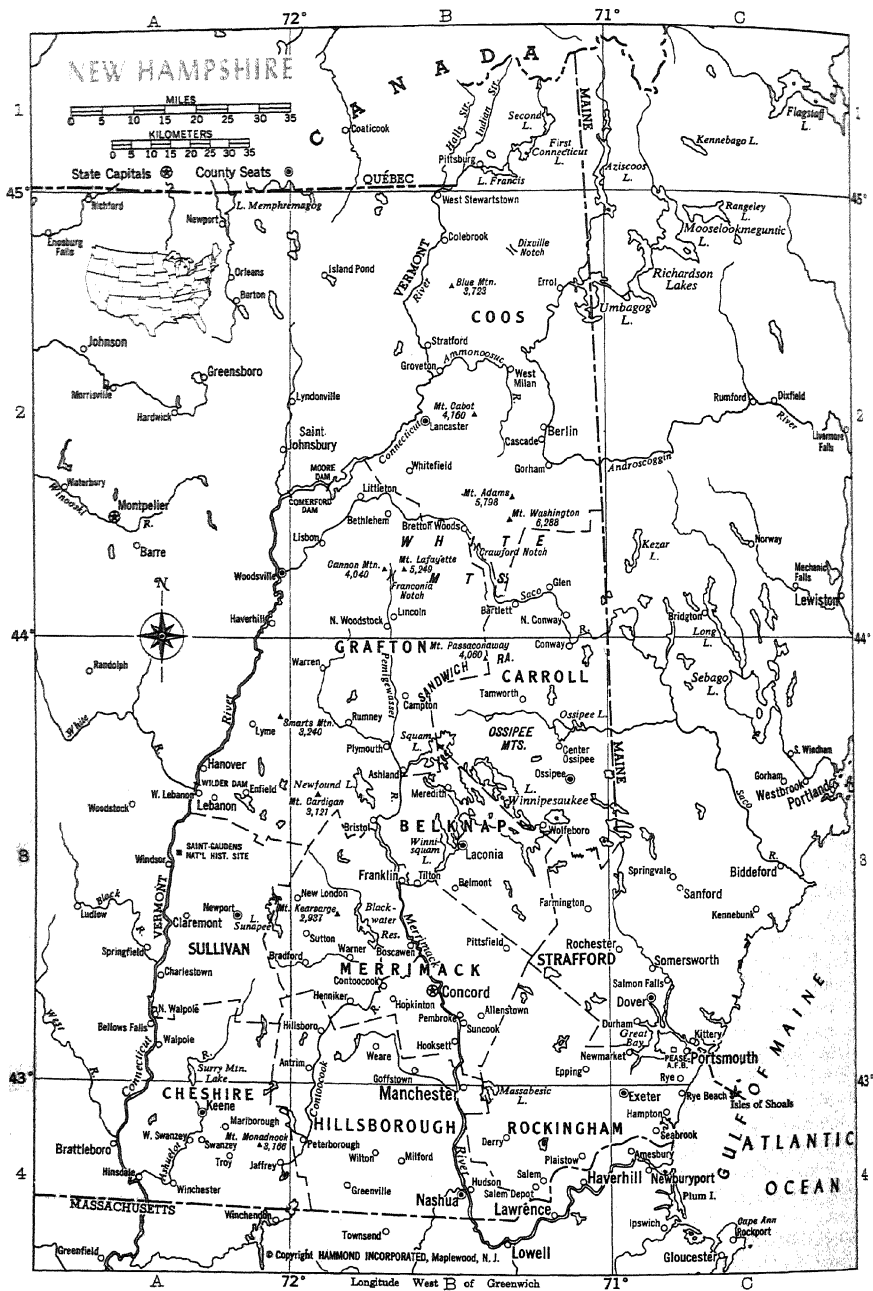
THE LAND

Mountains, lakes, and river systems are greatly intermingled in New Hampshire. The several mountain ranges in the N., notably the White Mountains (q.v.), belong to the N. extension of the Appalachian system. The highest elevation in the State is Mt. Washington (6288 ft.) in the Presidential Range of the White Mts. The average elevation of the State is 1000 ft. To the S. of the mountains, in the south-central area, is a plateaulike region traversed by the Merrimack R. In the S.E. is a narrow coastal plain.

Rivers and Lakes. The principal rivers of New Hampshire are the Merrimack R., with its tributaries the Pemigewasset, Contoocook, and Suncook; and the Connecticut R., which forms the border with Vermont and receives the Ammonoosuc and Ashuelot rivers. The Piscataqua R. forms part of the border with Maine. The Saco R. rises in the White Mts. and flows into Maine; and the Androscoggin R. rises in Lake Umbagog on the Maine border, flows S. in New Hampshire, and then into Maine. The State has more than 1300 bodies of water, ranging in size from Lake Winnepesaukee (71 sq.mi.), the largest lake in New Hampshire and one of the largest freshwater lakes wholly within one State, to tiny ponds in the wilderness. Other natural lakes are the Connecticut Lakes, the source of the Connecticut R.; Lake Sunapee; and Ossipee and Newfound lakes. Artificial lakes include Blackwater Reservoir on a tributary of the Merrimack R. and Surry Mt. Lake on the Ashuelot R.

Climate. Characteristic features of the climate of New Hampshire are changeableness of weather, wide range of temperature, both daily and annual, and equable distribution of precipitation. Summers are normally cool and dry, and the daily range of temperatures may reach 40° F. in valleys and lowlands. Winters are cold, with subzero readings frequent inland. The highest temperature recorded in the State was 106° F. (at Nashua); the lowest, -46° F. (at Pittsburg).

NEW HAMPSHIRE



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Surry Mountain (lake)	A 3
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Winnepesaukee (lake)	B 3
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Physical Features

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Precipitation averages 44 in. in the N. and 41 in. in the S. Annual snowfall in the S. averages from 50 in. near the coast to 68 to 80 in. inland; in the N., along the Connecticut R., it averages 60 in., increasing to more than 100 in. at higher elevations. The average annual number of days with measurable precipitation ranges from 124 at Concord to 204 on Mt. Washington. Coastal storms, or northeasters, bring strong winds and heavy rain or snow to coastal areas, and tropical storms occasionally occur in summer. Tornadoes are frequent but not hailstorms.

Plants and Animals. Almost 78 percent of the

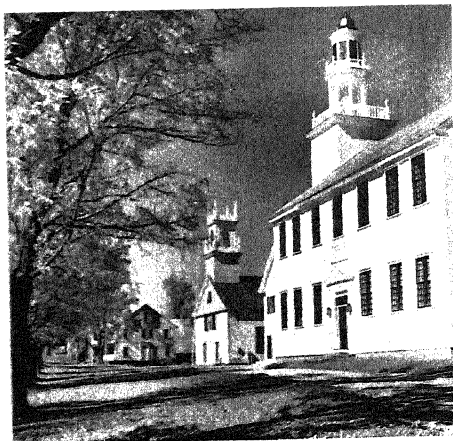
Climate	Concord	Mt. Washington
Normal temperatures (in ° F.)		
January maximum	31.3	14.1
January minimum	9.9	-2.8
July maximum	82.6	54.6
July minimum	56.7	43.0
Annual	45.6	26.9
Normal precipitation (in inches)		
Wettest month	3.96	7.67
Driest month	2.45	5.12
Annual	36.17	76.17
Latest frost	May 11	May 23
Earliest frost	Sept. 30	Sept. 22
Mean number of days between latest and earliest frosts	142	121

area of New Hampshire consists of forest. In the N.E. coniferous species of spruce, fir, and pine predominate. Elsewhere birch, beech, elm, oak, and maple are common. The many wild shrubs and flowering plants include blueberry, raspberry, juniper, laurel, rhododendron, goldenrod, daisy, mountain laurel, and violet. Various rare alpine plants grow in the White Mts.

The white-tailed deer, gray squirrel, beaver, red fox, raccoon, striped skunk, and woodchuck are among the many species of wildlife found in New Hampshire. Game birds, including the ruffed grouse, the introduced ring-necked grouse, and the bobwhite quail, are abundant. Freshwater fish include brook and lake trout, bass, and landlocked salmon. Lobsters are found in the short stretch of coastal waters.

Parks, Forests, and Other Places of Interest.

The Saint-Gaudens National Historic Site, at Cornish, is a memorial to the American sculptor Augustus Saint-Gaudens (q.v.), containing his home, "Aspet", and his studios and gardens. White Mountain National Forest, almost 680,000 acres near Berlin (partly in Maine), contains Mt. Washington and the Presidential Range. Among the many State parks, which are principally noted for their recreational facilities, are Bear Brook State Park, near Suncook; Echo Lake and Cathedral Ledge State parks, near North Conway; Greenfield State Park, near Greenfield; Mt. Sunapee State Park, near Newbury; and Rhododendron State Park, near Fitzwilliam Depot. In Franconia Notch is the "Old Man of the Mountain", a natural stone profile used by the American writer Nathaniel Hawthorne (q.v.) in his story "The Great Stone Face". Also in Franconia Notch is the narrow river gorge called the Flume. Other notches, or canyons, of the mountain area are Crawford, Pinkham, and Dixville notches. Mount Pleasant (4761 ft.), in the White



A village street in New Hampshire on a sunny autumn afternoon. The town is Washington, incorporated in 1776.
Dick Smith — State of New Hampshire

Mts., was renamed Mt. Eisenhower in 1970, in honor of former President Dwight D. Eisenhower (q.v.). The Isles of Shoals, eight rocky islets in the Atlantic Ocean S.E. of Portsmouth, and Madison Boulder, a huge glacial relic in Madison, are other points of interest. Historic sites include the birthplaces of Daniel Webster, near Franklin, of Horace Greeley, at Amherst; and of Franklin Pierce (qq.v.), in Hillsboro. Near Concord is a monument marking the birthplace of Mary Baker Eddy (q.v.), founder of Christian Science (q.v.). At Peterborough is the MacDowell Colony for artists, established by the widow of the American composer Edward A. MacDowell (q.v.).

Sports. With mountain streams and ponds, larger rivers and lakes, and 18 mi. of shoreline, New Hampshire offers excellent fishing. Among freshwater species are five varieties of trout, black bass, chain pickerel, white and yellow perch, horned pout, walleye, Great Lakes whitefish, cusk, and landlocked salmon. Saltwater species include hake, haddock, cod, pollack, mackerel, striped bass, and bluefin tuna. Large animals hunted in the State are white-tailed deer, black bear, and wild boar. Among small animals and birds are snowshoe hare, cottontail rabbit, gray squirrel, ring-necked pheasant, and ruffed grouse. New Hampshire has more than fifty ski areas, including Cannon Mt., at Franconia Notch; Mt. Sunapee, at Newbury; and Wildcat Mt., near Pinkham Notch. Mount Washington provides fine climbing, including ice climbing above the timberline.

THE PEOPLE

According to the 1970 decennial census, the population of New Hampshire was 737,681, an

increase of 21.5 percent over the 1960 population. The urban segment comprised 416,040 persons, 56.4 percent of the total, compared with 58.3 percent in 1960. The rural segment comprised 321,641 persons, 43.6 percent of the total, compared with 41.7 percent in 1960. Ethnically, the 1970 population was distributed as follows: white persons, 733,106; nonwhites, 4575, including 2505 Negroes and a sprinkling of Japanese, Chinese, Indians, Filipinos, and others. The percentage of native-born residents in 1970 was 95.0; of foreign-born, 5.0. The major country of origin of the foreign-born was Canada. The 1970 population density averaged 81.7 per sq.mi., compared with 67.2 in 1960.

The chief cities are Concord, the capital and third-largest city, a printing and electronics center; Manchester, the largest city, and Nashua, the second-largest, manufacturing centers; Portsmouth, the fourth-largest city, a shipbuilding and manufacturing center and resort; and Berlin, the fifth-largest, a wood pulp-processing center and resort in the White Mountains.

Education. The public-school system of New Hampshire was established in 1647. Education is free and compulsory for all children between the ages of six and sixteen.

ELEMENTARY AND SECONDARY SCHOOLS. In 1970 public elementary schools numbered about 375 and public secondary schools, about 100. Enrollment in 1971 was about 117,000 in elementary and about 47,000 in secondary schools. Teachers in the public-school system in 1972 numbered about 4100 in elementary and about 3350 in secondary schools. In 1970 private institutions included about 85 elementary and 50 secondary schools; enrollment in 1971 was about 22,000 elementary and about 11,000 secondary students. Teachers in private schools numbered more than 1400 in the late 1960's.

UNIVERSITIES AND COLLEGES. In 1970 New Hampshire had nineteen institutions of higher education, fifteen of which were private. University and college enrollment was about 29,000. Public institutions include the University of New Hampshire, New Hampshire College of Accounting and Commerce, and New Hampshire Vocational Institute. Private institutions include Dartmouth College (q.v.), Colby Junior College for Women, Franconia College, Nathaniel Hawthorne College, New England College, Notre Dame College, and Saint Anselm's College.

Libraries and Museums. The library in Peterborough was the first tax-supported public library established in the U.S. In Concord is the New Hampshire State Library, with about 400,000 volumes. Cultural institutions include

the New Hampshire Historical Society, in Concord; the Saint-Gaudens Museum, in Cornish, housing sculptures and casts by Augustus Saint-Gaudens; the Currier Gallery of Art, in Manchester; and the O. Rundle Gilbert Museum in Plymouth, which houses working models of inventions filed with the U.S. Patent Office between 1800 and 1900.

THE ECONOMY

New Hampshire has a diversified economy, with a heavy dependence on industry. Per capita personal income was \$5973 in 1976, compared with \$6441 for the U.S. as a whole. Agriculture employs very few of the State's workers. Nonagricultural workers are employed, in descending order of numbers, in manufacturing; wholesale and retail trade; service industries; government; finance, real estate, and insurance; construction; and transportation and public utilities. Manufacturing employs about 30 percent of New Hampshire's workers and makes up the largest share of the economy. Tourism, the second largest segment of the economy, brings about \$430,000,000 to the State each year. Vacation and ski resorts, sports fishing, and ocean beaches all bring tourists to New Hampshire. Forested areas provide recreation sites and produce lumber and raw material for paper.

Manufacturing. According to a recent survey of manufactures, production workers in New Hampshire total 64,400. The largest numbers are employed in the manufacture of paper and leather products and in food processing. About 20 percent are employed in the Standard Metropolitan Statistical Area (S.M.S.A.; q.v.) of Manchester, and about the same percentage in the S.M.S.A. of Nashua. Other large employment centers are the Lawrence-Haverhill and the Lowell S.M.S.A.'s. In the mid-1970's the annual value

added by manufacture in the largest industries totaled \$245,500,000 for electric and electronic equipment, \$219,000,000 for nonelectric machinery, and \$146,300,000 for paper and allied products. Leather and leather products, which ranked first in employment, ranked fifth in value added, at \$117,200,000. The annual value added by all manufacturing was about \$1.6 billion.

Agriculture. Agriculture plays a very small part in the New Hampshire economy. Principal agricultural commodities include milk, eggs, apples, and greenhouse products. About 3634 persons work on 2600 farms covering some 560,000 acres and averaging 215 acres each. In the mid-1970's the annual income from livestock and livestock products was \$57,688,000; from crop marketings, \$21,610,000. Total cash receipts from farming were \$79,987,000, giving the State a rank of forty-eighth in the nation.

Fishing. New Hampshire had some 536 commercial fishermen in the mid-1970's. The most valuable varieties landed included lobsters, pollock, and cod, with pollock leading in poundage. The annual value of the catch was about \$1,077,000. Clams constituted the most valuable of processed fishery products, and the total value of processed products was \$17,712,000.

Mining. The principal mineral products of New Hampshire are sand and gravel, stone, clays, and gemstones. In the mid-1970's total mineral production was valued at about \$17,000,000 annually, representing considerably less than 1 percent of all U.S. mineral production.

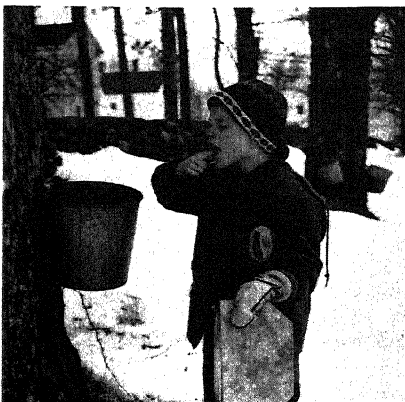
Energy. Generating plants in New Hampshire, with a capacity of 1,600,000 kw, produced about 5.2 billion kw hours of electric energy annually in the mid-1970's. About 4 percent of the capacity was publicly owned, but none of the production. Dams on the Merrimack and Connecticut rivers and steam plants are the sources of most of the State's electricity.

Forestry. The forest land of New Hampshire is divided almost equally between hardwoods and softwoods. The forest land, primarily under private ownership, comprises some 5,000,000 acres. It produces a net annual cut of sawtimber of about 220,000,000 bd.ft.

Transportation. The first railroad in New Hampshire was the Nashua & Lowell Railroad, inaugurated on Dec. 25, 1838; its identity has been lost through merger. Today New Hampshire has about 750 mi. of railroad track. The State has 15,300 mi. of municipal and rural highways and 1295 mi. of Federally assisted primary and secondary highways, including 214 mi. in the Interstate Highway System. New Hampshire is served by 1 international airline and 2 local or

Tasting sap from maple trees in Canterbury, N.H.

Bill Finney—State of New Hampshire



NEW HAMPSHIRE

interstate airlines. There are 14 public airports and 44 private ones.

Communications. The first newspaper in New Hampshire was the *New Hampshire Gazette*, founded in 1758 and still being published as the *Portsmouth Herald*. The State has 9 daily newspapers and 2 Sunday papers. Among the leading papers are the *Manchester Union Leader* and the *New Hampshire Sunday News* and the *Nashua Telegraph*. Of 51 radio stations in use in the mid-1970's, one of the oldest was WLNH, established in 1922. Television stations numbered 6.

GOVERNMENT

New Hampshire is governed under the original state constitution of 1784, as amended. Executive authority is vested in a governor, elected for a two-year term; a secretary of state and treasurer, selected by the legislature; and other officials. New Hampshire is one of three States having a Governor's Council, which among other duties assists the chief executive in making appointments and certain decisions. Legislative authority is exercised by the Senate with twenty-four members and the House of Representatives with 400 members, all elected for two-year terms. The legislature regularly meets biennially in odd-numbered years. The judicial system includes a five-member supreme court, a superior court, and several lesser courts.

New Hampshire is represented in the United States Congress by two Senators and two Representatives.

Local Government. The State is divided into ten counties, which are further divided into cities, towns, and unincorporated places. Most towns are administered by a board of three selectmen, one of whom is chosen annually for a three-year term.

Voting Qualifications. Suffrage is extended generally to U.S. citizens eighteen years of age who have resided six months in the State.

HISTORY

The first explorer of the New Hampshire region was the English captain Martin Pring (1560-1626?), who anchored in Piscataqua harbor in 1603. In 1605 the French explorer Samuel de Champlain (q.v.) sailed along the coast and discovered the Isles of Shoals. In 1614 the English colonist and soldier John Smith (q.v.) visited Piscataqua harbor and some inland regions. In 1620 the region was granted to the Council for New England, formerly the Plymouth Company (q.v.), by James I (q.v.), King of England. The council, in 1622, granted all the land lying between the Merrimack and Kennebec rivers for 60 mi. inland to Sir Ferdinando Gorges and John Mason (qq.v.). The title of the grant was the "Province

of Maine". In 1623 the town of Little Harbor was established on the site of present-day Rye. On Nov. 7, 1629, the province was divided and that part lying between the Piscataqua and Merrimack rivers was given to Mason; the title of the grant was "New Hampshire".

Several trading stations were established within the grant, the most important of which was Strawberry Bank, later Portsmouth. The Council for New England was dissolved in 1635, and Mason was confirmed in all his grants by the crown and given an additional 100,000 acres west of the Kennebec R. In 1638 John Wheelwright (1592?-1679), a clergyman banished from Massachusetts, founded the settlement of Exeter. The Puritan Massachusetts Bay Colony looked with disfavor upon the settlements of the royalists and churchmen in New Hampshire and laid claim to the territory. In 1641 all the settlements were joined to the Massachusetts Bay Colony except Exeter, which followed in 1643. Mason's grandson, Robert Tufton Mason, became sole heir to the province in 1655, and he applied to the crown for restitution of the territory. Legal difficulties delayed a decision until 1677, when it was ruled that Massachusetts had usurped possession of the territory. In 1679 a decree declaring New Hampshire a royal province was issued. From 1686 to 1689 the province of New Hampshire was part of the Dominion of New England, which was under the governorship of Sir Edmund Andros (q.v.).

Attempts of the residents of New Hampshire to establish a provincial authority met with failure, but in 1692 a royal government was established. From 1699 to 1741 New Hampshire was governed by the royal governor of Massachusetts. Boundary disputes between the two colonies were frequent. The problem was finally resolved in 1741 when the southern and eastern boundaries of New Hampshire with Massachusetts were permanently fixed. Boundary disputes with New York, over the question of the possession of Vermont, continued until 1764, however, when New York succeeded in fixing the western border of New Hampshire at its present limits, the Connecticut R.

Statehood. In 1776 New Hampshire became the first colony to adopt its own constitution. During the American Revolution the majority of its inhabitants were patriots. At Bennington, New Hampshire and Vermont troops inflicted a costly defeat upon the British; see BENNINGTON, BATTLE OF. On June 21, 1788, New Hampshire became the ninth State by ratifying the Constitution of the United States (q.v.). With the exception of 1804, when the majority



A hiker in New Hampshire's White Mountain National Forest, admiring the view from Moat Mt. Dick Smith-
State of New Hampshire

of the people of the State voted for Thomas Jefferson (q.v.), Democratic-Republican, New Hampshire was Federalist in national politics until 1816. In the latter year the Democrats gained control by capturing both State and national elections. The Democrats lost power in the State in 1855, when the Know-Nothings (q.v.), a third party, won the electoral votes of the State.

During the years preceding the American Civil War, reform movements advocating temperance and the abolition of slavery gained strength in New Hampshire. After the Civil War industry, transportation, and communications expanded rapidly in the State. The textile industry became especially important.

During the latter half of the 19th century large-scale immigration of French Canadians into the State altered the ethnic composition of the population, which had been chiefly English and Scotch-Irish. Many of these immigrants worked in the rapidly growing leather and shoe industries. As cities and factories expanded, rural life lost in importance. By the mid-1900's shoe manufacturing had sharply declined and was replaced by a major electronics industry. State agencies actively sought to attract other new enterprises as well, and in the 1970's manufacturing ranked as the State's largest economic producer.

Tourism, which has played an increasingly important role in the State's economy since the turn of the century, now ranks as the second largest industry. To encourage further growth, New Hampshire is implementing a series of vigorous antipollution measures.

NEW HARMONY, town of Indiana, in Posey Co., on the Wabash R., 22 miles N.W. of Evansville. Oil-field equipment is made in New Harmony. The town was founded in 1815, with the name of Harmonie, by members of a religious sect known as the Harmonists (q.v.), under the leadership of German religious reformer George

Rapp (q.v.); see *COMMUNISM: History: Early American Experiments in Communism*. The colonists, who were mostly German, had moved to the site from an earlier settlement in Pennsylvania. They held their property in common and engaged in agriculture, weaving, and the manufacture of leather goods. In 1825 the Harmonists sold their holdings to British social reformer Robert Owen (see *under* OWEN) and returned to Pennsylvania. Owen and his followers renamed the site New Harmony and established a community that put into practice Owen's theories on cooperative living. As a result of internal dissension, however, the colony was dissolved in 1828 and property passed into private hands. Many of the original buildings of the Harmonists still remain. The Roofless Church in New Harmony, designed in 1960 by the American architect Philip Cortelyou Johnson (q.v.), is approached through doors designed by the American sculptor Jacques Lipchitz (q.v.). Pop. (1960) 1121; (1970) 971.

NEW HAVEN, city in Connecticut, and county seat of New Haven Co., on Long Island Sound, 35 miles S.W. of Hartford. New Haven is a port of entry and a manufacturing center. Among the diversified manufactures are chemicals, rubber goods, locks, and toys. Several noted educational and cultural institutions are located in the city, including Yale University (q.v.), Southern Connecticut State College, and Albertus Magnus College. At the center of the city is New Haven Green, site of three graceful early 19th-century churches, Center Church, Trinity Church, and United Church. Among other buildings of historical interest are the home of the American lexicographer Noah Webster (q.v.) and Pierpont House, built in 1767.

New Haven maintains a municipal park area covering about 2100 acres, including Lighthouse

NEW HEBRIDES

Point, with a municipal bathing beach, and Nathan Hale Park, which contains the ruins of old Fort Hale, used when New Haven was blockaded during the War of 1812. Adjoining New Haven are the towns of North Haven (pop, 1960, 15,935; 1970, 22,194), incorporated in 1786, West Haven (pop, 1960, 43,002; 1970, 52,851), incorporated in 1921, and East Haven (pop, 1960, 21,388; 1970, 25,120), incorporated in 1785 and the site of the first iron mill in Connecticut. **History.** Originally named Quinnipiac, the area was settled in 1638 by a group of English Puritans, including the clergyman John Davenport (q v) and the merchant and colonial administrator Theophilus Eaton (1590-1658). Two years later the name was changed to New Haven. The town soon united with the communities of Guilford, Wilford, Branford, and Stamford, in present-day Connecticut, and Southhold, on Long Island, to form New Haven Colony. Eaton became the first governor of the colony, a position he held until his death.

In 1665 New Haven became a part of Connecticut Colony, which had received a charter in 1662 entitling it to all lands held by New Haven Colony, see CONNECTICUT. **History.** From 1701 to 1875 New Haven and Hartford (q v) were joint capitals of Connecticut. In 1784 New Haven was incorporated as a city. Industrialization began in 1798 when the American inventor Eli Whitney (q v) opened a firearms factory. In the late 18th and early 19th centuries, New Haven was an important sealing port. Pop (1960) 152,048, (1970) 137,707.

NEW HEBRIDES, group of islands in the Pacific Ocean, about 1150 miles NE of Australia. The New Hebrides are made up of twelve principal islands and many smaller ones. Some are composed of coral, others are of volcanic origin, and several volcanoes are active. The climate is damp, hot, and unhealthy, especially between November and April. Some of the islands are fertile, the chief products including bananas, pineapples, cocoa, coffee, copra and timber, especially sandalwood.

The New Hebrides were first sighted by the Portuguese navigator Pedro Fernandez de Queirós (1562?-1614) in 1606. They were visited by the French explorer Louis Antoine de Bougainville (q v) in 1768. The British navigator Captain James Cook (q v) visited the islands in 1774 and, because their rugged appearance suggested the Hebrides Islands off the northern coast of Scotland, he called them the New Hebrides. Since 1906, when a convention was entered into between Great Britain and France, the New Hebrides have been administered by a

condominium, a joint administration of the two nations. The convention provided that British and French nationals should have equal rights in all respects, and that each power should retain jurisdiction over its own subjects or citizens.

Because they stretch across the sea routes between the United States and Australia, the islands were considered of strategic importance during World War II. The U.S. established a large naval and air base at Espiritu Santo, northernmost of the islands. Area, 5700 sq mi, pop (1974 est.) 90,000.

NEW IBERIA, city in Louisiana, and parish seat of Iberia Parish, about 50 miles SW of Baton Rouge. It is a refining and commercial center for an area rich in oil, salt, sugarcane, and vegetables. Important manufactures are furniture and processed food, including the condiment Tabasco sauce. New Iberia was settled in the second half of the 18th century and incorporated in 1839. Pop (1960) 29,062, (1970) 30,147.

NE WIN. See BURMA, UNION OF. *History*

NEW IRELAND. See BISMARCK ARCHIPELAGO

NEW JERSEY, one of the Middle Atlantic States of the United States, bounded on the NE by New York, on the E by the Atlantic Ocean and the Hudson R., on the S by Delaware Bay, and on the SW, W, and NW by the Delaware R. In shape, New Jersey forms a long oval, measuring about 167 mi. from N to S and from about 35 to 70 mi. from E to W.

Area (46th State in rank)	7836 sq. mi.
Land	7521 sq. mi.
Inland water	315 sq. mi.
Population	(1970, 8th in rank) 7,168,164
	(1960, 8th in rank) 6,066,782
	(1950) 4,835,329
Altitude	sea level to 1803 ft.
Capital	Trenton (1970) 104,638
Largest city	Newark (1970) 382,417
Entered Union (3rd of original 13)	Dec. 18, 1787
Nickname	The Garden State
Motto	Liberty and Prosperity
Flower	purple violet
Bird	eastern goldfinch

THE LAND

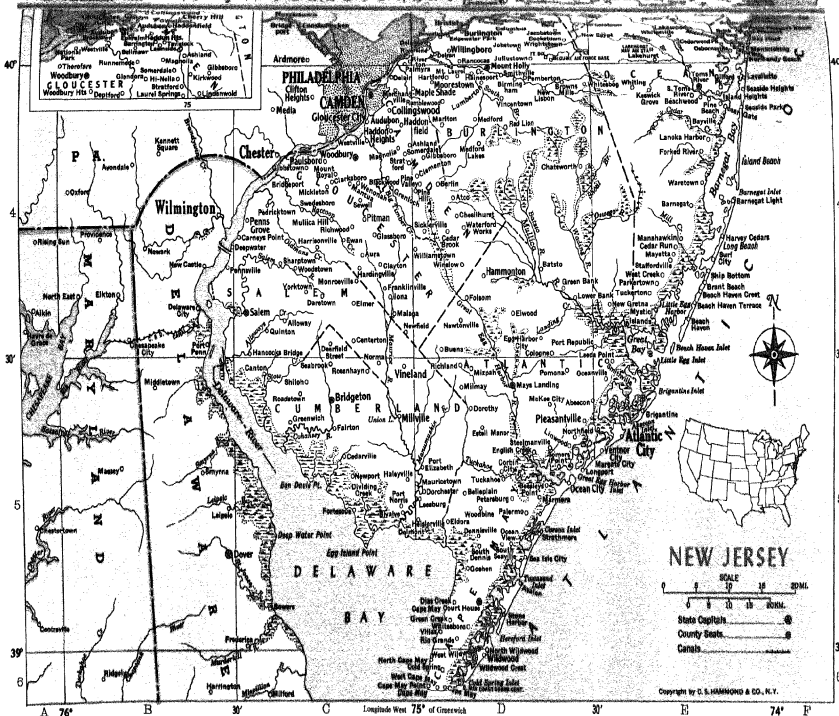
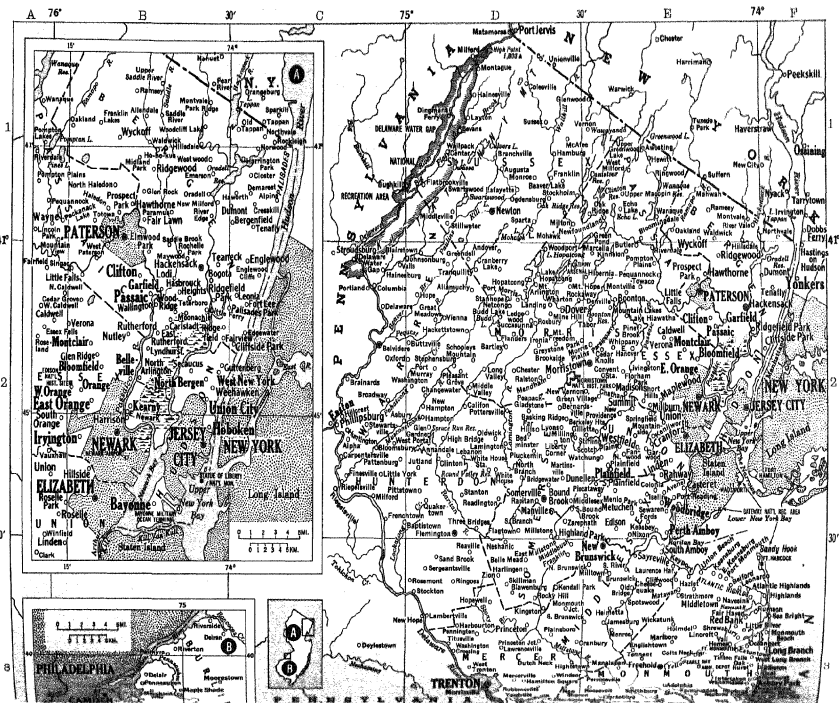
Topographically, New Jersey is divided into four main regions, the Atlantic Coastal Plain, the Triassic Lowland, the Highlands, and the Appalachian Mts. The coastal plain occupies the entire S half of the State. It is a gently undulating plain drained by sluggish rivers and bordered along the coast by salt marshes.

The Triassic Lowland, constituting a fifth of the area of the State, is bounded on the SE by the coastal plain and on the NW by a line that runs roughly parallel to the Trenton-Woodbridge line and extends through Morristown from the New York boundary to the Pennsylvania boundary. It consists of a rolling plain ranging in elevation from sea level in the E to over

INDEX TO MAP OF NEW JERSEY

[illegible]

County seat.



[illegible]

900 ft. in the w. The plain is diversified by bold traprock ridges, the best known of which is the Palisades (q.v.), extending along the Hudson R.

The third topographical division, the Highlands, is a continuation of the Berkshire Hills of Massachusetts and the Highlands of New York. The Highland area, encompassing about 900 sq.mi., consists of rounded, forested hills separated by cultivated valleys. It is bordered on the se by the Triassic Lowland and on the nw by the fourth topographical province. This fourth province consists of the Kittatinny Mts. and their valley, a part of the Appalachian mountain system. The range enters New Jersey from Pennsylvania and traverses the State in a nearly continuous ridge into New York. At High Point the ridge reaches an elevation of 1803 ft. above sea level, the highest altitude in the State. The Kittatinny valley borders the ridge to the nw. and the Highlands to the se. The lowest point in New Jersey is at sea level, and the average elevation is 250 ft.

Rivers and Lakes. Most of New Jersey is drained by rivers that flow directly into the Atlantic Ocean or into arms of the ocean. A narrow section along the w. boundary is drained by small rivers and streams that flow into the Delaware R. The chief rivers of the State are the Passaic, Hackensack, Raritan, Mullica, Great Egg, and Maurice. The Delaware R. forms the entire w. boundary with Pennsylvania and Delaware. The Hudson R. forms the ne. boundary with New York. Lakes are confined chiefly to the glaciated n. section of New Jersey, the largest lakes are Hopatcong and Greenwood, the latter lying partly in New York State. New Jersey has a coastline of about 132 mi. Measured around tidal bays, inlets, and estuaries, the coastline has a length of 1660 mi.

Climate. New Jersey has a moderate climate, with marked differences, particularly in winter, between the s. tip at Cape May and the n. extremity in the Kittatinny Mts. The s. area, almost

surrounded by water, has milder winters; the n. is colder, having greater elevation and lying within the influence of Great Lakes storms. The highest temperature recorded in the State was 110° F. (at Runyon), the lowest, -34° F. (at River Vale). Average annual precipitation ranges from 40 in. on the se. coast to 51 in. in north-central parts of the State and is well distributed during the summer. Seasonal snowfall ranges from 13 in. at Cape May to 50 in. in the highlands. The average annual number of days with measurable precipitation is 122 at Atlantic City, Newark, and Trenton. Tornadoes occur occasionally, as do tropical storms, sometimes of hurricane force.

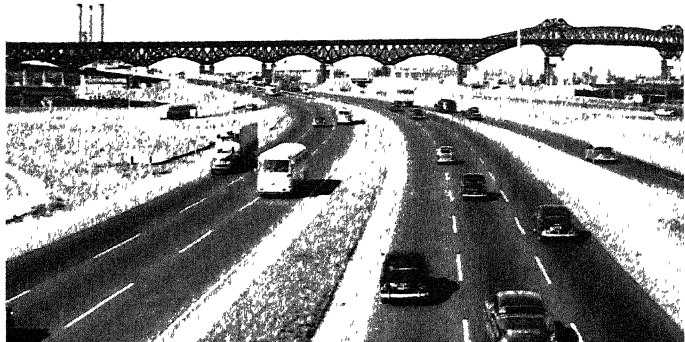
Climate	Atlantic City	Newark	Trenton
Normal temperatures (in ° F.)			
January maximum	41.4	38.5	38.8
January minimum	24.0	24.3	25.3
July maximum	84.7	85.6	84.9
July minimum	65.4	67.9	66.8
Annual	53.7	53.9	54.0
Normal precipitation (in inches)			
Wettest month	4.52	4.27	4.74
Driest month	2.70	2.82	2.53
Annual	41.89	41.45	40.17
Latest frost	March 31	April 3	April 4
Earliest frost	Nov. 11	Nov. 8	Nov. 8
Mean number of days between latest and earliest frosts	225	219	218

Plants and Animals. Among the plants indigenous to New Jersey are the wild azalea, golden-rod, daisy, lady's slipper, honeysuckle, mountain laurel, butterfly weed, and cardinal flower. Ferns grow in abundance. Trees include species of ash, birch, oak, maple, beech, cedar, pine, holly, and sweet gum.

Animals often seen in the State are the gray squirrel, the eastern chipmunk, the eastern cottontail rabbit, the woodchuck, opossum, raccoon, and gray and red foxes. Less common is the white-tailed deer. Snakes include two poisonous species, the copperhead and the timber rattlesnake, and about eighteen other species. Prominent birds are the robin, blue jay, bluebird, wren, oriole, goldfinch, hummingbird, and

In 1752 the stagecoach line of Joseph Borden, one of the settlers of Bordentown, N.J., took about three days to travel between New York and Philadelphia. Today one can make the trip on the New Jersey Turnpike in less than three hours.

Asphalt Institute





Newark Airport, one of three main air terminals serving that serve the New York metropolitan area.

New York Port Authority

brown thrasher. Shore birds include gulls, herons, ospreys, and ducks. Marine life includes oysters, clams, weakfish, flounder, bluefish, tuna, bass, shad, bonito, and marlin.

Parks, Forests, and Other Places of Interest.

The Edison National Historic Site, at Orange, contains the buildings and equipment used by the American inventor Thomas A. Edison (q.v.) for many of his experiments, his library, and models of some of his inventions, and "Glenmont", his 23-room home. Morristown National Historical Park, at Morristown, encompasses the site of the headquarters of George Washington (q.v.) in 1777 and 1779-80 and the sites of American Revolution military encampments. The Delaware Water Gap area in New Jersey and Pennsylvania was authorized as a national recreation area in 1965. The 26,172-acre Gateway National Recreation Area, partly in New York, was authorized in 1972. The State maintains numerous parks and forests. Palisades Interstate Park, partly in New York, lies along the Palisades of the Hudson R. Among others are Edison Park, at Menlo Park, containing a memorial tower and museum; High Point Park, on Kittatinny Mt.;

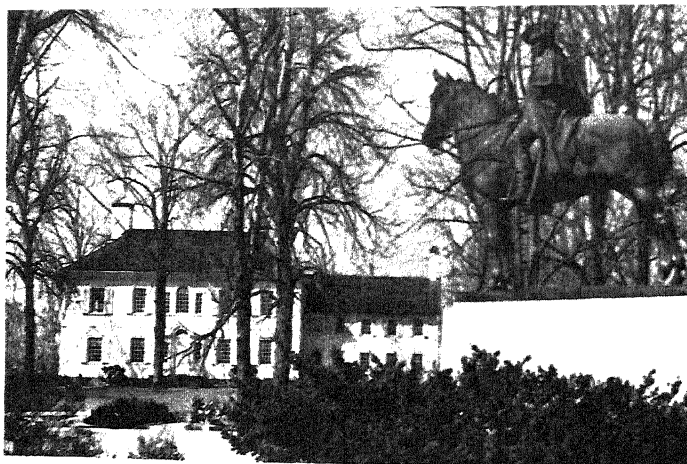
Princeton Battlefield Park, near Princeton; Washington Crossing Park, near Trenton, where Washington crossed the Delaware R.; and Washington Rock Park, on First Watchung Mt., near Dunellen. Other points of historic interest include Batsto Village, a restored early village near Hammonton; Boudinot House, in Elizabeth, built about 1750; Molly Pitcher's Well, near Freehold, from which Molly Pitcher (q.v.) is said to have drawn water for the soldiers during the Battle of Monmouth (q.v.); and Hancock House, near Salem, where patriots were murdered by the British.

Sports. Freshwater fishing in New Jersey is maintained by the stocking of rivers. Species found include brown, brook, and rainbow trout, black bass, channel catfish, crappie, pickerel, sunfish, bluegill, and white and yellow perch. Saltwater fishermen bring in sea trout, striped and channel bass, bluefish, flounder, kingfish, porgy, blackfish, albacore, fluke, tautog, dolphin, snapper, mackerel, and bluefin tuna. New Jersey offers ski activity in the N. part of the State. The largest are Great Gorge at McAfee and Vernon Valley at Vernon.

THE PEOPLE

According to the 1970 decennial census, the population of New Jersey was 7,168,164, an in-

Washington's headquarters in Morristown, N.J., during the American Revolution. In the foreground is a statue of the general. Ward Allan Howe



crease of 18.2 percent over the 1960 population. The urban segment comprised 6,373,405 persons, 88.9 percent of the total, compared with 88.6 percent in 1960. The rural segment comprised 794,759 persons, 11.1 percent of the total, compared with 11.4 percent in 1960. Ethnically, the 1970 population was distributed as follows: white persons, 6,349,908; nonwhites, 818,256, including 770,292 Negroes, 9233 Chinese, 5681 Japanese, 4706 Indians, 5623 Filipinos, and a sprinkling of others. The percentage of native-born residents in 1970 was 91.1; of foreign-born, 8.9. The major countries of origin of the foreign-born, in order of rank, were Germany, Poland, and Great Britain. The 1970 population density averaged 953.1 per sq.mi., the highest in the U.S.; it was 805.5 in 1960.

The chief cities are Trenton, the capital and fifth-largest city, an industrial and commercial center; and, in order of population, Newark, a major industrial center with extensive transportation facilities; Jersey City, a railroad, commercial, and industrial center; Paterson, site of textile and diversified manufacturing; Elizabeth, an industrial city; and Camden, the industrial, marketing, and transportation center of s. New Jersey, linked by bridge with Philadelphia, Pa.

Education. The public-school system of New Jersey was established in 1816. Education is free and compulsory for all children between the ages of seven and sixteen.

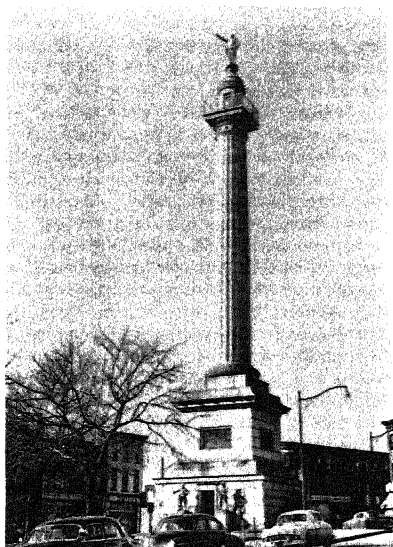
ELEMENTARY AND SECONDARY SCHOOLS. In 1970 public elementary schools numbered about 2020 and public secondary schools, about 430. Enrollment in 1971 was about 1,060,000 in elementary and about 440,000 in secondary schools. In 1970 private institutions included about 600 elementary and 175 secondary schools; enrollment in 1971 was about 242,000 and 71,000 students, re-

spectively. Teachers in private schools numbered about 10,275 in the late 1960's.

UNIVERSITIES AND COLLEGES. In 1970 New Jersey had fifty-six institutions of higher learning, thirty-four of which were private. University and college enrollment was about 211,000 in 1970. Public institutions include Rutgers, the State University (q.v.); Newark College of Engineering (1881); State colleges at Glassboro, Jersey City, Montclair, Paterson, Trenton, and Newark; and county community colleges. Among private institutions are Drew University, Princeton Theological Seminary, Princeton University, Seton

A battle monument marks the spot where General Washington's Continental artillery opened fire upon the Hessians at Trenton on Dec. 26, 1776.

Trenton Chamber of Commerce



NEW JERSEY

Hall University (q.v.), The Institute for Advanced Study, Stevens Institute of Technology (1867), Bloomfield College (1868), Centenary College for Women (1867), Fairleigh Dickinson University (1942), Saint Joseph's College (1938), and Upsala College.

Libraries and Museums. The two outstanding public libraries in the State are the Newark Public Library, with more than 800,000 volumes, and the Division of State Libraries of the New Jersey State Department of Education, in Trenton, with some 500,000 volumes. Cultural institutions include the Montclair Art Museum; the New Jersey Historical Society, with special material on railroad history, and the Newark Museum, both in Newark; and the New Jersey State Museum, in Trenton.

THE ECONOMY

New Jersey is an industrial State. Per capita personal income in 1976 was \$7269, compared with \$6441 for the U.S. as a whole. Agriculture employs fewer than 1 percent of the State's workers. Nonagricultural workers are employed, in descending order of numbers, in manufacturing; wholesale and retail trade; service industries; government; transportation and public utilities; finance, real estate, and insurance; and construction.

Manufacturing. According to a recent survey of manufactures, production workers in New Jersey total 470,900. The largest numbers are employed in the manufacture of chemicals, clothing, electrical equipment, nonelectrical machinery, and fabricated metals and in food processing. About 29 percent of the workers within the State are employed in the Standard Metropolitan Statistical Area (q.v.) of Newark. The greatest numbers, however, are employed in the S.M.S.A. that includes New York City, and in the Philadelphia S.M.S.A. In the mid-1970's the annual value added by manufacture (see VALUE) totaled \$4.83 billion for chemicals, \$1.85 billion for food industries, and \$1.46 billion for electrical equipment. The annual value added by all manufacturing was about \$17.9 billion.

Agriculture. New Jersey's principal agricultural products are milk, greenhouse products, eggs, and tomatoes; it ranks fortieth among the States in cash receipts from agricultural production. About 22,000 persons work on 7900 farms covering some 1,025,000 acres and averaging 130 acres each. In the mid-1970's annual cash receipts from farming totaled about \$335,153,000, including \$224,717,000 from crops and \$109,603,000 from livestock.

Fisheries. New Jersey fisheries provide clams, menhaden, lobsters, flounders, and oysters. In

the mid-1970's some 3099 persons were employed as commercial fishermen in the State, and the annual value of their catch was about \$16,600,000. The most valuable processed fishery products were shucked and minced clams, clam chowder, and clam dips and sauces. The total annual value of processed fishery products was about \$72,500,000.

Mining. The principal mineral products of New Jersey are stone, sand and gravel, zinc, and titanium concentrate. Mineral production during the mid-1970's was valued at about \$124,000,000 annually, giving the State a rank of thirty-eighth in the U.S.

Energy. Generating plants in New Jersey, with a capacity of 11,600,000 kw, produced about 26 billion kw hours of electric energy annually in the mid-1970's. Less than 1 percent of production and 3 percent of capacity were publicly owned. Three nuclear reactors were among the sources of energy; steam plants produced the major portion.

Forestry. The forest land of New Jersey, which consists predominantly of hardwoods, comprises some 2,463,000 acres, mostly under private ownership. It produces a net annual cut of sawtimber of some 37,000,000 bd.ft.

Tourism. Tourism is a major income producer in New Jersey, yielding more than \$1.2 billion annually. Coastal resorts and lake and mountain areas provide recreation for millions of tourists summer and winter. Legalized casino gambling in Atlantic City was expected to raise the value of tourism considerably in the late 1970's.

Transportation. The first railroad in New Jersey was the Camden & Amboy R.R., inaugurated on Nov. 12, 1831, and now a part of Conrail. At present New Jersey has a total of about 1676 mi. of track. Rural and municipal roads total some 33,000 mi.; Federally aided primary and secondary roads total about 3418 mi., including 388 mi. in the Interstate Highway System. The State is served by 8 international airlines and 7 local or interstate lines. There are 26 public and 196 private airports. The major seaport of New Jersey is its share of the Port of New York, the busiest port in the U.S. Such Delaware R. ports as Paulsboro and Camden-Gloucester are also important. The New Jersey Intracoastal Waterway traverses the Atlantic coast. Other commercially navigable waterways include the Delaware and Raritan rivers; Newark Bay and the Hackensack and Passaic rivers; and the New York and New Jersey channels from Sandy Hook, N.J., to Upper New York Bay.

Communications. The first newspaper in New Jersey was the *New Jersey Gazette*, founded in



Atlantic City, a classic resort community with a new angle: legalized casino gambling.
City of Atlantic City

1777. Today the State has 28 daily newspapers and 13 Sunday papers. Among the leading papers are the Newark *Star-Ledger*, the Bergen County *Record*, and the Camden *Courier-Post*. Of some 93 radio stations operating in the mid-1970's, one of the oldest was WAAT, established in 1923 in Trenton. Ten television stations were in operation.

GOVERNMENT

New Jersey is governed under the constitution of 1947, as amended. Executive authority is vested in a governor, elected for a four-year term; an attorney general and a secretary of state, both appointed by the governor; and other officials. Legislative authority is exercised by the Senate with forty members, elected for four-year terms (except once each decade when, immediately following each Federal census, they are elected for two-year terms); and the General Assembly with eighty members, elected for two-year terms. The legislature meets annually. The judicial system includes a supreme court, a superior court, county courts, and various local and special courts. New Jersey is divided into twenty-one counties.

New Jersey is represented in the United States Congress by two Senators and fifteen Representatives.

Voting Qualifications. Suffrage is extended generally to U.S. citizens eighteen years of age who have resided six months in the State and forty days in the county.

HISTORY

New Jersey was first claimed by the Dutch as part of New Netherland, and sometime before 1625 the Dutch established settlements in what

is now Hudson County. In 1638 a Swedish settlement was established on the New Jersey side of the Delaware R. In 1664 Charles II (q.v.), King of England granted the entire region to his brother James, Duke of York, later James II (q.v.), King of England, who in turn granted the land between the Hudson and Delaware rivers to John Berkeley (d. 1678) and Sir George Carteret (see under CARTERET). The State received its name from the Isle of Jersey, which had been governed by Carteret from 1643 to 1651.

In 1664, during the Dutch Wars, the English seized New Amsterdam from the Dutch and secured the English claim to New Jersey. Berkeley and Carteret promulgated a charter for the government of New Jersey in the following year. In 1673 the Dutch temporarily recaptured the territory, but in 1674, by the Treaty of Westminster, it was restored to the English. In the same year Berkeley sold his interest to two English Quakers (see FRIENDS, SOCIETY OF), who settled in the western part of the territory. Later, William Penn (q.v.) and some of his associates purchased the area, which was then called West Jersey, from the original buyers and in 1677 drew up a constitution called "the Concessions and Agreements of the Proprietors, Freeholders and Inhabitants of West Jersey in America". The Quaker colony flourished, and in 1682 Carteret's heirs sold East Jersey to Penn and his associates. In 1702 the proprietors of New Jersey ceded their right of self-government to the crown but retained the right of ownership of the land. New Jersey came under the political jurisdiction

NEW KENSINGTON

of the governor of New York until 1738, when the colony received its own governor. In 1776, during the American Revolution (q.v.), the royal governor, William Franklin (q.v.), was deposed and arrested, and on July 18, 1776, a provincial congress ratified the Declaration of Independence and changed the title of the colony to the State of New Jersey. During the war the State was the site of many important battles.

Early Growth. Canals were constructed in New Jersey in the early part of the 19th century, and in 1834 the first railroad, the Camden & Amboy, was completed. In 1860 Abraham Lincoln (q.v.) received four of the State's seven electoral votes. After the Civil War the State was the scene of a bitter railway dispute. In 1871 the Pennsylvania Railway Co. was given a 999-year lease on properties lying between New York and Philadelphia. Other railways were almost eliminated from competition until 1873, when the State legislature passed a bill granting additional railway lines the right of way between New York and Philadelphia.

In the ensuing years, manufacturing in New Jersey gained considerable momentum, until the economic slump of the 1930's produced widespread unemployment. It was not until World War II that the State's production of vital war materials led to economic recovery. With the postwar influx of many important firms, New Jersey entered a period of extraordinary expansion, and major new transportation systems opened the way to regional development.

But such rapid growth was also attended by burgeoning urban problems and dissatisfaction, as exemplified by the predominantly nonwhite city of Newark. In 1967 Newark was among several U.S. cities struck by riots; twenty-six deaths resulted, and damages were estimated at \$15 million.

In the 1970's New Jersey has begun many large urban renewal projects. With the introduction of a sales tax and bond issues, it plans to expand its educational and transportation facilities, to launch major pollution and conservation programs, and to exploit the revenue-producing potential of the marshy Meadowlands area. The State expects a dramatic boost to its economy from the legalization in 1978 of casino gambling in Atlantic City.

NEW KENSINGTON, city of Pennsylvania, in Westmoreland Co., on the Allegheny R., 14 miles N.E. of Pittsburgh. The city is one of the largest producers of aluminum products in the world; other manufactures include steel products and glassware. The city was laid out in 1891 on the site of an old fort. It was incorporated as

a borough in 1892 and as a city in 1933. Pop. (1960) 23,485; (1970) 20,312.

NEW LONDON, city and port of entry in Connecticut, and one of two county seats of New London Co., on Long Island Sound, at the mouth of the Thames R., 45 miles E. of New Haven. The city has a wide, deep harbor. Major industries include submarine building and ship repairing. Antibiotics, textiles, and clothing are manufactured in New London. It is also a popular summer resort. The annual rowing race between the crews of Harvard and Yale universities takes place here on the Thames R.

Among the many points of historical interest found in the city are Nathan Hale Schoolhouse, where the Revolutionary hero taught school, New London Lighthouse (1760), Fort Trumbell (1849), and a whaling museum. New London today is the site of the United States Coast Guard Academy (q.v.), a U.S. Coast Guard base, and the New London Naval Submarine Base. Connecticut College, founded here in 1911, holds an annual summer dance festival.

The site of New London was laid out in 1646 by the English colonist John Winthrop (see *under* WINTHROP). During the American Revolution (q.v.), it was an important base for privateers, and it was attacked and burned in 1781 by British forces led by the former American general Benedict Arnold (q.v.). New London was incorporated as a city in 1784. It was blockaded by the British during the War of 1812 (q.v.). In the 19th century the city was a leading whaling port. Pop. (1960) 34,182; (1970) 31,630.

NEWMAN, Cardinal John Henry (1801-90), British religious leader, at first in the Church of England and later in the Roman Catholic Church (qq.v.), born in London, England, and educated at Trinity College, University of Oxford. In 1822 he obtained an Oriel College fellowship, then the highest distinction of Oxford scholarship, and thus was brought into close association with a number of the most illustrious men of the time. In 1826 Newman was appointed a tutor at Oriel and two years later became vicar of Saint Mary's, the (Anglican) church of the University of Oxford. In this position he exerted a pervasive influence upon contemporary religious thought through his learned and eloquent sermons. He resigned his tutorship in 1832 and in the following year made a tour of the Mediterranean region, during which he wrote the famous hymn (q.v.) "Lead, Kindly Light".

Newman returned to England in time to hear the memorable sermon, "On the National Apostasy", preached at St. Mary's by his fellow Oxonian, John Keble (q.v.). This sermon defined the

religious issues of the time and marked the inception of the Oxford movement (q.v.), a movement within the Church of England directed against the growth of theological liberalism and advocating the return to theology and ritual of the period following the Reformation; see CHRISTIANITY: *Differences in Doctrine and Worship*; REFORMATION; SACRAMENT; TRANSUBSTANTIATION.

Newman, whose own religious thinking had for some time been along similar lines, soon be-



Cardinal John Henry Newman

Bettmann Archive

came the acknowledged leader of the Oxford group, a role for which his vital personality, fervent asceticism, and persuasive eloquence preeminently qualified him. He was one of the chief contributors to the *Tracts for the Times* (1833-41), for which he wrote twenty-nine papers, including the famous *Tract 90*, which terminated the series. That final tract provoked a storm of opposition by its claim that the Thirty-nine Articles of the Church of England (see ARTICLES, THE THIRTY-NINE), which incorporate the creed of the Reformed Church in England, are aimed primarily at the abuses and not the dogmas (see DOGMA) of Roman Catholicism. The thesis was repudiated by Anglican dignitaries, who almost universally declared against the Oxford movement.

In 1842 Newman retired from Oxford to the neighboring village of Littlemore, where he passed three years in seclusion, writing at this time a formal retraction of the adverse criticisms of the Roman Catholic Church that he had made on previous occasions. He also resigned

his post as vicar of St. Mary's and on Oct. 9, 1845, after writing his *Essay on the Development of Christian Doctrine*, which expressed the final crystallization of his ideas, he became a Roman Catholic. A year later he went to Rome, where he was ordained priest and entered the Congregation of the Oratory; see ORATORY, CONGREGATION OF THE. Upon his return to England he introduced the Oratorians there.

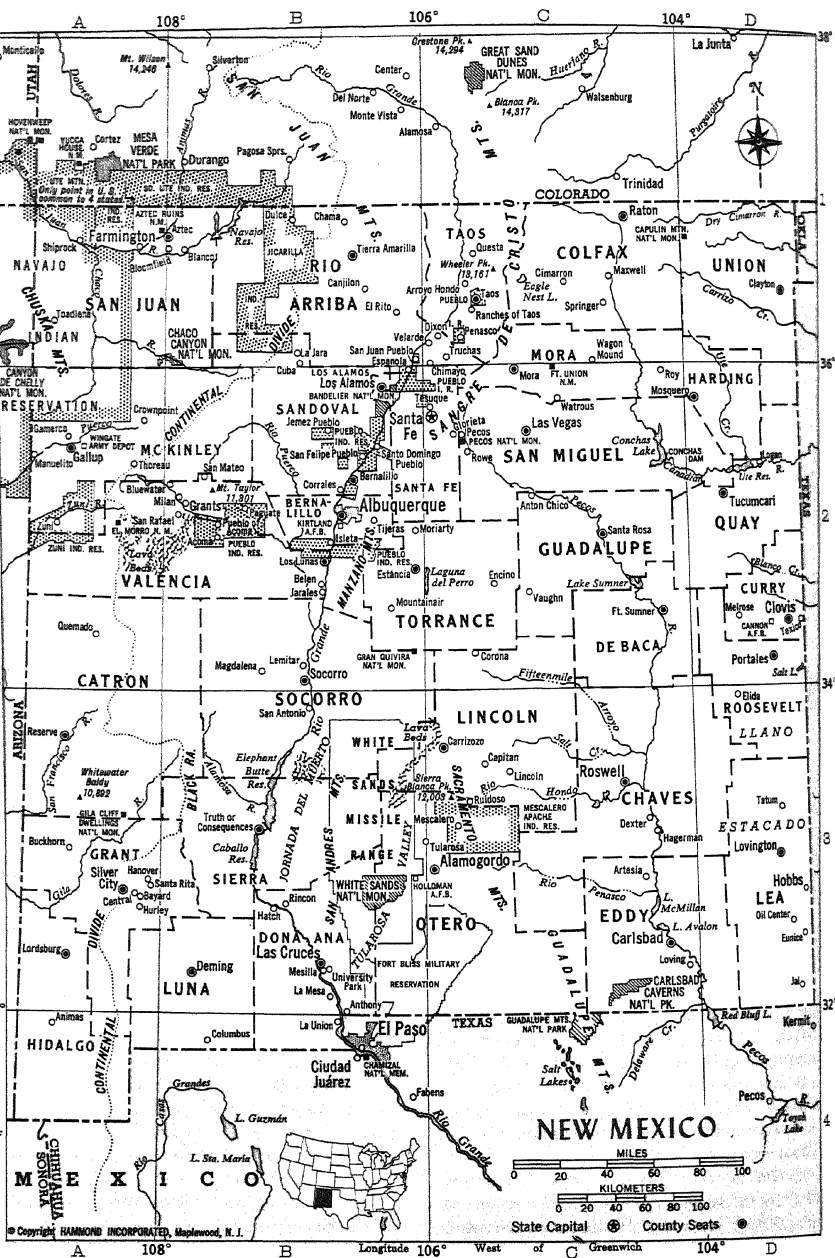
Newman spent most of the remainder of his life in the house of the Oratory, which he had established near Birmingham. From 1854 to 1858, however, he served as rector of a Catholic university that the bishops of Ireland were attempting to establish in Dublin. The institution failed, but while there Newman delivered a series of lectures, subsequently revised and published as *The Idea of a University Defined* (1873), in which he defined the function of a university as the training of the mind, rather than the diffusion of practical information. In response to a charge by the British novelist Charles Kingsley (q.v.) that Roman Catholicism was indifferent to the truth, Newman in 1864 published his masterpiece, *Apologia pro Vita Sua* ("Apology for His Life"), a memorable account of his spiritual development that is an acknowledged classic both of religious autobiography and English prose. He was elected an honorary fellow of Trinity College, Oxford, in 1877, and Pope Leo XIII (see under LEO) created him a cardinal in 1879. Newman's other important writings include *An Essay in Aid of a Grammar of Assent* (1870), a closely reasoned work on the philosophy of faith. He also wrote the novels *Loss and Gain* (1848) and *Callista* (1856); *The Dream of Gerontius* (1865), a monologue in verse; and *Verses on Various Occasions* (1874). **NEWMARKET**, Great Britain, urban district of West Suffolk Co., England, 12 miles N.E. of Cambridge. Light industry includes the manufacture of electronic devices. Since the early 17th century Newmarket has been a horse-racing center; at present eight major races are held annually. Devil's Dyke, a prehistoric mound and ditch, traverses one of the race courses. Pop. (1971) 12,951.

NEW MEXICO, one of the Mountain States of the United States, bounded on the N. by Colorado, on the E. by Oklahoma and Texas, on the S. by Texas and Mexico, and on the W. by Arizona. New Mexico is roughly square in shape, measuring about 395 mi. from N. to S. and 355 mi. from E. to W.

THE LAND

The surface of New Mexico is a vast, gently undulating plain dotted with steep, rocky moun-

NEW MEXICO



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© County seat.

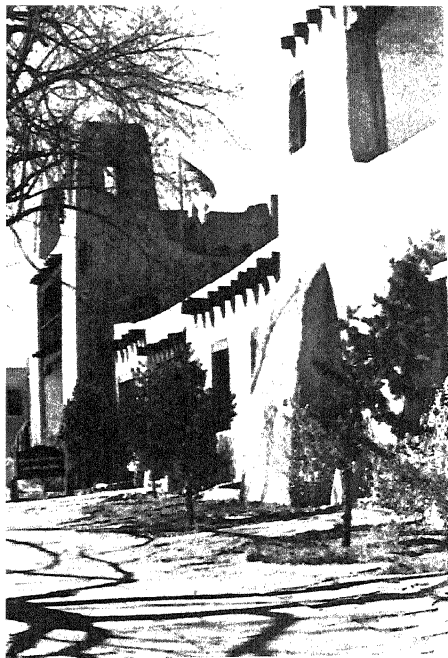
tains and traversed by occasional valleys and canyons. A spur of the Rocky Mts. enters the State from the N., and its isolated ranges and peaks occupy scattered portions of New Mexico. The Sangre de Cristo Mts. occupy the north-central region, various ranges and sierras traverse the W., and the Guadalupe Mts. in the south-central region extend across the border into Mexico. The highest point in the State is Wheeler Peak (13,161 ft.) in Taos County. The lowest point, 2817 ft., is in Eddy County. The mean elevation of New Mexico is 5700 ft.

Area (5th State in rank)	121,666 sq. mi.
Land	121,412 sq. mi.
Inland water	254 sq. mi.
Population	(1970, 37th in rank) 1,016,000
	(1960, 37th in rank) 951,023
	(1950) 681,187
Altitude	2817 ft. to 13,161 ft.
Capital	Santa Fe (1970) 41,167
Largest city	Albuquerque (1970) 243,751
Entered Union (47th State)	Jan. 6, 1912
Nickname	Land of Enchantment
Motto	It Grows As It Goes
Song	"O, Fair New Mexico"
Flower	yuca
Bird	roadrunner

Rivers and Lakes. The Continental Divide extends N. to S. through the W. part of New Mexico. Rivers E. of the Divide ultimately drain into the Gulf of Mexico; rivers W. of the Divide drain into the Gulf of California. The principal rivers are the Rio Grande (q.v.), which enters New Mexico in Taos County and flows S. through the west-central part of the State; and the Pecos R., which rises in the Sangre de Cristo Mts. and flows S.E. into Texas. Other rivers include the Rio Puerco and Rio Salado, tributaries of the Rio Grande; the Chaco R., which joins the San Juan R. in the extreme N.W.; the Zuni and Gila rivers, which rise in the mountains of the W.; and the Canadian R. in the E.

New Mexico has several man-made lakes, including Elephant Butte and Caballo reservoirs on the Rio Grande, Conchas Reservoir on the Canadian R., Alamogordo Reservoir on the Pecos R., and Navajo Reservoir on the San Juan R.

Climate. New Mexico has a mild, arid or semi-arid continental climate characterized by light



The relatively modern fine arts building of the Museum of New Mexico, in Santa Fe, retains the charm of the colonial Spanish past. Each facade is modeled after an historic New Mexico mission church. UPI

precipitation, abundant sunshine, low relative humidity, and a wide annual and daily temperature range. At times the E. plains are invaded by continental air masses that generate cold waves and blizzards. Summers are moderately warm in general, and winters are mild. The highest temperature recorded in the State was 116° F. (at Orogrande); the lowest, -50° F. (at Gavilan). Average annual precipitation ranges from 10 in. in the S. desert and the Rio Grande and San Juan valleys, to more than 20 in. at higher elevations over the State, and occurs almost entirely in thundershowers. Annual snowfall averages from 3 in. on the S. border to 100 in. in the N. mountains. The average annual number of days with measurable precipitation ranges from 49 at Ros-

well to 58 at Albuquerque, 67 at Clayton, and 75 at Raton. Tornadoes occur about twice a year, and hail accompanies the more severe summer thunderstorms.

Plants and Animals. The flora and fauna of New Mexico are varied because of the diversified nature of the terrain. In the N. regions of the state the plant life is typically evergreen, with species of pine, fir, and spruce as examples. Mesquite, cactus, cottonwood, and desert willow are among the plants and trees of the S. valleys. Also found are buffalo grass and other grasses, and cacti of several species.

Wildlife includes rabbits of many species, squirrels, rats, mice, bats, and skunks, and other carnivores. Other animals found in the State are the coyote, deer, wolf, prairie dog, elk, mountain lion, bobcat, mountain sheep, black bear, and mink. A herd of Barbary sheep, introduced from Africa, has flourished under State protection. Trout are plentiful in the mountain rivers and streams.

Parks, Forests, and Other Places of Interest. Carlsbad Cavern National Park (q.v.), near Carlsbad, the largest known subterranean labyrinth, has 7 mi. of lighted trails and many underground chambers. In New Mexico are ten national monuments: Aztec Ruins National Monument, Bandelier National Monument; Capulin National Monument, Chaco Canyon National Monument, El Morro National Monument, Fort Union National Monument, Gila Cliff National Monument, Gran Quivira National Monument, Pecos National Monument, and White Sands National Monument, (qq.v.). The State has six national forests, comprising more than 9,000,000 acres. Carson National Forest, near Taos, lies in the Sangre de Cristo Mts. and contains Wheeler Peak. Cibola National Forest, near Albuquerque, contains prehistoric ruins and the ancient "sky city" of Acoma. Coronado National Forest, near Lordsburg (partly in Arizona), is an area of contrasts, ranging from desert to mountains, from cacti to fir trees. Gila National Forest, near Las Cruces, is largely undeveloped alpine country. Lincoln National Forest, near Alamogordo, includes White Mt. (12,000 ft.), with a wild area and resort cities. Santa Fe National Forest, near Santa Fe, contains wild and wilderness areas and the headwaters of the Pecos, Jemez, and Gallinas rivers.

Sports. With man-made lakes and a number of major rivers, New Mexico offers interesting fishing. Among the species found are the brown, eastern brook, cutthroat, and rainbow trout, black bass, bluegill, yellow perch, channel catfish, walleye pike, and crappie. Large game

Climate	Albuquerque	Roswell
Normal temperatures (in ° F.)		
January maximum	46.9	55.4
January minimum	23.5	20.8
July maximum	92.9	94.7
July minimum	65.2	63.7
Annual	56.8	59.1
Normal precipitation (in inches)		
Wettest month	1.39	1.81
Driest month	.29	.29
Annual	7.77	10.87
Latest frost	April 16	April 9
Earliest frost	Oct. 29	Nov. 2
Mean number of days between latest and earliest frosts	196	208

NEW MEXICO

hunted includes white-tailed and mule, deer, black bear, elk, antelope, Barbary sheep, and javelina. Small game includes tree squirrel, ring-necked pheasant, blue grouse, and the Gambel's, bobwhite, and scaled quail. Although skiing activities are available as far s. as Alamo-gordo during the winter, most of the ski runs are in the n. counties. Red River has a run with a 1524-ft. drop. Others include La Madeira, near Albuquerque, and Taos Ski Valley, at Taos.

THE PEOPLE

According to the 1970 decennial census, the population of New Mexico was 1,016,000, an increase of 6.8 percent over the 1960 population. The urban segment comprised 709,000 persons, 68.9 percent of the total, compared with 65.9 percent in 1960. The rural segment comprised 307,000 persons (31.1 percent of the total), compared with 34.1 percent in 1960. Ethnically, the 1970 population was distributed as follows: white persons, 915,815; nonwhites, 100,185, including 72,788 Indians, 19,555 Negroes, and a sprinkling of Japanese, Chinese, Filipinos, and others. The percentage of native-born residents in 1970 was 97.8; of foreign-born, 2.2. The major country of origin of the foreign-born was Mexico. The 1970 population density averaged 8.4 per sq.mi., compared with 7.8 in 1960.

The chief cities are Santa Fe, the capital and second-largest city, a resort and art center; Albuquerque, the largest city, an industrial and transportation center; Las Cruces, the third-largest, trade center for an agricultural and mining region; and Roswell, the fourth-largest, a center

for agricultural industries in a farming region.

The Navajo Indian reservation is the largest in size and population in New Mexico. Pueblo tribes have nineteen reservations in the State, of which the largest is the Zuni reservation. Apache live on reservations at Jicarilla and Mescalero.

Education. The public-school system of New Mexico was established in 1721. Education is free and compulsory for all children between the ages of six and seventeen.

ELEMENTARY AND SECONDARY SCHOOLS. In 1970 public elementary schools numbered about 415 and public secondary schools, about 210. Enrollment in 1971 was about 200,000 in elementary and about 85,000 in secondary schools. Teachers in the public-school system in 1972 numbered about 6110 in elementary and about 5750 in secondary schools. In 1970 private institutions included about 95 elementary and 30 secondary schools; 1971 enrollment was about 15,000 elementary and 3000 secondary students. Teachers in private schools numbered about 1050 in 1966.

UNIVERSITIES AND COLLEGES. In 1970 New Mexico had eleven institutions of higher learning, three of which were private. University and college enrollment was about 43,000. State institutions include the University of New Mexico, Eastern New Mexico University, New Mexico Highlands University, New Mexico Institute of Mining and Technology, New Mexico Military

The Red River valley nestles in the Sangre de Cristo Mts. of northern New Mexico.

New Mexico Dept. of Development





Irrigation projects are transforming the parched soil of New Mexico into colorful, productive land.

U.S. Bureau of Reclamation

Institute, New Mexico State University, and Western New Mexico University. Private institutions are represented by College of Santa Fe, College of the Southwest, and the University of Albuquerque.

Libraries and Museums. New Mexico has about forty public libraries and three regional libraries. Cultural institutions include the Historical Society of New Mexico, in Albuquerque; the Pancho Villa Museum, in Columbus; the Roswell Museum and Art Center, a science museum housing the Robert H. Goddard rocket collection; and the Museum of Navajo Ceremonial Art, with records and sand paintings related to Navajo myths, and the Museum of New Mexico, both in Santa Fe.

THE ECONOMY

New Mexico has a diversified economy. Per capita personal income was \$5213 in 1976, compared with \$6441 for the U.S. as a whole. About 6 percent of the State's workers are engaged in agriculture and a similar percentage in mining. Nonagricultural workers are employed, in descending order of numbers, in government; wholesale and retail trade; service industries; manufacturing; construction; transportation and public utilities; and finance, real estate, and insurance. The mountains, recreation areas, historic sites, and Indian reservations attract many tourists, who spend about \$700,000,000 annually. New Mexico has benefited from the recent migration of population to the South and West; its

population increased by 17 percent from 1970 to 1977.

Manufacturing. According to a recent survey, of manufactures, production workers in New Mexico total about 20,000. The largest numbers are employed in the food products industry and in miscellaneous manufacturing. About 55 percent of the production workers are employed in the Standard Metropolitan Statistical Area (q.v.) of Albuquerque. Roswell, Las Cruces, Farmington, Clovis, and Santa Fe are regional business centers. In the mid-1970's the annual value added by manufacture (see VALUE) in the largest industries was about \$95,700,000 for food products, \$57,500,000 for electrical and electronic equipment, and \$51,200,000 for miscellaneous manufacturing. The value added by all manufacturing industries was about \$484,500,000 annually.

Agriculture. Cattle, milk, hay, and sorghum grains are the most important agricultural commodities of New Mexico. About 24,800 persons are employed on 11,700 farms in the State. Farmland covers some 47,100,000 acres, and the average size of a farm is about 4026 acres. In the mid-1970's the total value of cash receipts from agriculture in New Mexico was about \$712,000,000 annually, of which \$518,000,000 came from livestock and \$194,000,000 from crops.

Mining. In the mid-1970's New Mexico ranked eighth among U.S. States in value of mineral production. It ranked in the top ten States in petroleum production, and in the top four in production of natural gas. Copper and potassium salts were other valuable mineral products. The total value of mineral production was about \$2.1 billion annually.

Energy. Generating plants, with a capacity of 4,600,000 kw, produced about 20.3 billion kilowatt hours of electrical energy annually in the mid-1970's. Approximately 4.3 percent of production and 8.2 percent of capacity were publicly owned.

Forestry. The forest land of New Mexico, which consists predominantly of softwoods, comprises some 6,000,000 acres, mostly under public ownership. It produces a net annual cut of sawtimber of some 262,000,000 bd.ft.

Transportation. The first railroad in New Mexico was the Atchison, Topeka & Santa Fe Railway, inaugurated on Dec. 7, 1878. Today the State is served by several railroads and has about 2057 mi. of track. There are about 70,600 mi. of municipal and rural highways in the State, and about 10,048 mi. of Federally assisted primary and secondary highways, including 1000 mi. in the Interstate Highway System. The State is

Sheep grazing near the village of Aztec, in northwestern New Mexico.

Denver and Rio Grande
Western Railroad



served by 3 international and 5 local and inter-state airlines; there are about 62 public and 72 private airports.

Communications. The first newspaper in New Mexico was the Spanish-language *El Crepúsculo de la Libertad* ("The Dawn of Liberty"), founded in Santa Fe in 1834. The first English-language paper was the *Santa Fe Republican*, founded in 1847. In the mid-1970's the State had about 20 daily papers and 12 Sunday papers; among the leading papers are the *Albuquerque Journal* and *Tribune*, and the *Santa Fe New Mexican*. There are some 93 radio stations and 12 television stations in New Mexico; one of the first radio stations to begin broadcasting was KOB, Albuquerque, in 1922.

GOVERNMENT

New Mexico is governed under the constitution of 1911, as amended. Executive authority is vested in a governor, a lieutenant governor, an attorney general, and a secretary of state, all elected for two-year terms, and other elected and appointed officials. Legislative authority is exercised by the Senate, with forty-two members elected for four-year terms; and the House of Representatives, with seventy members elected for two-year terms. The legislature meets annually. The judicial system of New Mexico includes a five-member supreme court, a court of appeals, district courts, and various lesser courts.

New Mexico is represented in the United States Congress by two Senators and two Representatives.

Local Government. The State is divided into thirty-two counties, each governed by a three-member elected board of commissioners. Other county officials include the clerk, assessor, and sheriff.

Voting Qualifications. Suffrage is extended generally to U.S. citizens eighteen years of age

who meet the residence requirements (one year in the State, ninety days in the county, and thirty days in the election district).

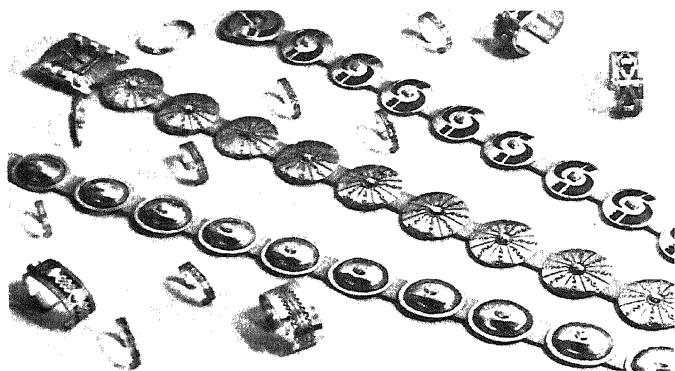
HISTORY

The first explorers of the region of New Mexico were Spanish. In 1536 Álvaro Núñez Cabeza de Vaca (q.v.) visited the New Mexico and Arizona area, and from 1540 to 1542 Francisco Vázquez Coronado (q.v.) traversed the region and conquered the Zuñi pueblos (see PUEBLO INDIANS). Other Spanish explorers, priests, and conquerors visited the territory, and in 1598 the first settlement was established at San Juan de los Caballeros in the Chama R. valley. Santa Fe was founded in 1609. The Indians revolted against the Spanish missionaries and settlers in 1680, and drove them out of the territory. The Spanish

At the Santa Fe Fiesta. The music and costumes of the orchestra reflect a Spanish heritage.

New Mexico State Tourist Bureau





Examples of Indian silver jewelry made by students at the U.S. Indian School in Santa Fe, New Mexico
Dept. of Development

reconquered the region between 1692 and 1696. The region became a province of Mexico in 1821, when the country gained its independence from Spain; see *MEXICO: History*. Mexico legalized trade (which had been discouraged under the Spanish) between the province and American settlements in the Missouri valley. The Republic of Texas (see *TEXAS: History*) claimed the Rio Grande as its western boundary and twice sent expeditions to New Mexico (1841 and 1843) in an effort to conquer the region. Both expeditions failed.

The Territory. In the Mexican War (q.v.), U.S. forces under the command of Colonel Stephen Watts Kearny (see *under* KEARNY) occupied the province, and on Aug. 18, 1846, the entire territory was declared a part of the U.S. A military government ruled the region for five years. The region formed part of the Mexican cession by the Treaty of Guadalupe Hidalgo, on Feb. 2, 1848, ending the Mexican War. On Sept. 9, 1850, the Territory of New Mexico was created, including also the present State of Arizona and part of Colorado. In 1853 the Gadsden Purchase was added to the territory. In 1863 Arizona was set off and established as a territory, and the western boundary of New Mexico was fixed at its present limits. In 1865 the northern portion of the Territory of New Mexico was added to the newly formed Territory of Colorado.

During the Civil War, New Mexico was invaded by Confederate forces. They were defeated by Union forces in 1862 and forced to retire from the territory. The remainder of the century was marked by the settlement of marauding Apache and Navaho Indians on reservations, and by expansion of the railways, economic development of the territory, and range warfare between the cattle and sheep interests.

In June, 1906, Congress passed a bill providing for the admission of New Mexico and Arizona as one State, on condition that a majority of electors in each territory approved such a

union. A majority of the New Mexico electors approved, but a majority of Arizona electors voted against the proposal, thus leaving the territorial status of each unchanged. On Jan. 6, 1912, New Mexico was admitted to the Union as a State.

On July 16, 1945, New Mexico was the site of the first atomic bomb explosion; see ALAMOGORDO. Since then, under the guidance of the secretary of defense or the Atomic Energy Commission, various proving grounds and research centers have been established in the State for the development of guided missiles and atomic projects.

Today, expanded uranium, molybdenum, and coal mining plants and the influx of new industries stimulate New Mexico's economic growth. Tourism is gaining momentum as winter sports resorts are improved and increased. And, although lack of water has always been a problem, completion in the late 1970's of the San Juan-Chama project, bringing water from Rocky Mountain rivers, promises to aid flood control and irrigation and to provide new recreational facilities.

NEW ORLEANS, largest city in Louisiana, and parish seat of Orleans Parish, with which the corporate limits of the city are coextensive, on the Mississippi R., 107 mi. from the mouth of the river in the Gulf of Mexico, and about 75 miles S.E. of Baton Rouge. Most of the city occupies a site between the river and Lake Pontchartrain on the N., which is connected with the river by a 5-mi.-long canal. The flat site, consisting of soil deposited by the river, is about 10 ft. below the level of the Gulf of Mexico, from 3 to 6 ft. below the high-water level of the Mississippi, and, to a great extent, below the level of the lake. Earthen levees protect the city on all sides from flood, but drainage and sanitation are major civic problems. One of the major American ports, New Orleans is able to accommodate the largest of ships in its docks; its facilities serve more than ninety steamship lines, which bring almost

a billion dollars worth of goods into the port annually. The city is served by eight railroads and is the terminus of three canals, and numerous airlines operate out of two airports.

New Orleans is popularly called the Crescent City because the original settlement formed a crescent around a bend in the river. The city is considered one of the most picturesque in the United States and is famous for the section called the Vieux Carré, or French Quarter. The houses that line the narrow streets of this section are built in a style that combines French and Spanish influences. Notable characteristics of the style are balconies of intricate iron grillwork and enclosed courtyards. In the heart of the French Quarter is Jackson Square, once called the Place d'Armes, surrounded by such historic buildings as the Cabildo, once the administrative center under French and Spanish rule, and the Old Cathedral of Saint Louis. Dixieland jazz (q.v.) is still played on Basin, Bourbon, and Ramparts streets, where it originated early in the 20th century. Canal Street separates the French Quarter from the more modern American section, which contains the commercial buildings and banks and residential areas. Audubon Park, on the river, and City Park, between the city and the lake, are the largest park areas. The chief institutions of higher learning are Tulane University of Louisiana (q.v.), Louisiana State University in New Orleans (1956), and Loyola University (Roman Catholic 1849). New Orleans is famous as a cultural center, and the French Quarter is the temporary or permanent home of many American writers, painters, and musicians. Thousands of tourists visit the city annually for the carnival season, from Twelfth Night to Lent, which is climaxed by the pageant of the Mardi Gras.

Commerce and Industry. New Orleans is the largest center in the U.S. for trade in cotton, cottonseed products, and rice. Sugar, bananas, coffee, bauxite, and molasses are among the principal imports. The chief exports are petroleum products, iron and steel, corn, and cotton. The major industrial establishments manufacture sugar and sugar products, clothing, alcohol and spirits, and cottonseed oil.

History. New Orleans was founded about 1718 by Jean Baptiste Lemoyne, Sieur de Bienville (q.v.), then governor of the French Louisiana colony, who named the settlement for Philippe II, Duc d'Orléans (see under ORLÉANS), then regent of France. In 1722 the town was made the capital of the colony. Following the partition of Louisiana between England and Spain in 1762–63, New Orleans (called *Nouvelle Orléans*) be-

came the capital of Spanish Louisiana. The French citizens revolted against Spain and expelled the Spanish governor in 1768; the revolt was short-lived, however, and a show of force in 1769 reestablished Spanish rule.

New Orleans was ceded secretly to France in 1800, and in the space of only twenty days (Nov. 30–Dec. 20, 1803) it was formally ceded first to France and then, by the terms of the Louisiana Purchase (q.v.), to the U.S. Under American enterprise, development of the city was rapid. At the time of annexation New Orleans had about 10,000 inhabitants; five years later its population had more than doubled. The city was incorporated in 1805 and became the State capital in 1812. In 1815, at the close of the War of 1812 (q.v.), the city was attacked by a British force. General Andrew Jackson commanded an American army that decisively defeated the invaders in the Battle of New Orleans (qq.v.), on Jan. 8, 1815. During the following four decades New Orleans enjoyed great prosperity. Trade was tremendously increased by the advent of the steamboat and railroads, and by 1852 the city was the third largest in the U.S.

During the Civil War, New Orleans, as the chief Confederate port and a military center, was a focal objective of Union Troops. Admiral David Glasgow Farragut (q.v.), commanding a Union fleet, captured the city in April, 1862, and the port was held by the Union until the end of the war; see CIVIL WAR, THE AMERICAN. From 1865 to 1877 the history of New Orleans was characterized by racial and political strife incited by so-called carpetbaggers (q.v.), who encouraged the freed slaves to persecute their former masters. Riots became so frequent that the Federal government declared martial law in 1874. The government forces were withdrawn in 1877.

During the period of Reconstruction (q.v.) the city slowly recovered. The capital was transferred to Baton Rouge in 1880, and civic enterprise devoted itself to commercial development and public works.

Population. Between 1910 and 1950 the population of New Orleans increased from 339,075 to 570,445. In 1960 the population was 627,525, and in 1970 it was 593,471.

NEW ORLEANS, BATTLE OF, name of two battles fought near New Orleans, La., one in the War of 1812 (q.v.) and the other in the American Civil War (see CIVIL WAR, THE AMERICAN).

1. The Battle of New Orleans of the War of 1812 was fought on Jan. 8, 1815, between about 6500 American troops, mostly irregulars, under the command of the American general Andrew Jackson (q.v.), and a British force of about 7500,



The defeat of the British at the Battle of New Orleans on Jan. 8, 1815, fifteen days after the signing of the peace treaty at Ghent.

Granger Collection

commanded by the British general Sir Edward Michael Pakenham (1778–1815). The British planned to attack New Orleans and thereby gain access to the entire Mississippi Valley. The entrance of British troops into the Gulf of Mexico in the autumn of 1814 prompted Jackson's arrival at New Orleans on Dec. 1, 1814. Later that month a fleet of fifty British vessels made a surprise landing at Lake Borgne, east of New Orleans, after which some 2000 British troops walked across the swamps to the banks of the Mississippi a few miles below New Orleans. Jackson hastily fortified the area. After a number of skirmishes during late December and early January, Jackson, with the valuable aid of the French pirate Jean Lafitte (q.v.), won the decisive battle in less than a half hour on Jan. 8. Jackson's improvised fortifications proved highly effective and the American force suffered only 71 casualties while inflicting more than 2000 casualties; General Pakenham was one of the 289 British dead. The overwhelming defeat caused the British to abandon further combat projects, and they soon embarked for England. The battle had no effect on the war. Peace terms had already been agreed upon in the Treaty of Ghent, signed on Dec. 24, 1814; at the time of the battle, however, the treaty had not yet been ratified by the United States Senate. See GHENT, TREATY OF.

2. The Battle of New Orleans of the American

Civil War occurred as a result of the Federal government's plan to seize New Orleans, one of the most important cities in the South. A naval squadron under Union Admiral David Glasgow Farragut, carrying troops led by Union General Benjamin Franklin Butler (qq.v.), appeared in the lower Mississippi R. in the spring of 1862. To prevent the capture of New Orleans the Confederates placed a heavy chain cable across the river near the city; New Orleans was also defended by forts Jackson and Saint Philip. After several days of firing on the forts, Farragut succeeded in cutting the chain and passing the forts during the earliest hours of April 24. The Union forces sank or captured nine of the seventeen Confederate vessels; emerging virtually without damage to their own ships, they proceeded to New Orleans. The city, inadequately protected by only 3000 Confederate troops, fell on April 25, was occupied by Federal troops on May 1, and held for the duration of the war. The loss of New Orleans, gateway to the Mississippi river and valley and chief city and port of the Confederacy, was catastrophic.

NEW PHILADELPHIA, city in Ohio, and county seat of Tuscarawas Co., on the Tuscarawas R., about 21 miles s. of Canton. Manufactures include machinery, sheet metal, foundry and plastic products, and electric goods. Nearby is the restoration, which began in 1923, of Schoenbrunn village (1771–76), the first settlement in Ohio. In a coal and clay area, the city was founded in 1804 and incorporated in 1833. Pop. (1960) 14,241; (1970) 15,184.

NEWPORT, city in Kentucky, and county seat of Campbell Co., at the confluence of the Licking and Ohio rivers, opposite Covington, and about 2 miles S.E. of Cincinnati, Ohio, of which it is a residential suburb. Bridges crossing the rivers link Newport with both cities. Newport houses one of the largest steel plants in the State, a printing and publishing plant, and a brewery. Other important industries include metal products, men's clothing, and automobile parts. The first settlement on the site of the present city was established in 1789. Newport was incorporated as a town in 1795 and as a city in 1835. Pop. (1960) 30,070; (1970) 25,998.

NEWPORT, city in Rhode Island, and county seat of Newport Co., on Narragansett Bay, 25 miles S.E. of Providence. It is a port of entry and a major summer resort and yachting center, famous for annual jazz and folk-music festivals. Newport is the site of a United States Navy depot and of electronics and wire-manufacturing plants. The city is composed of a modern area, containing bathing beaches and summer residences, and an old section, with narrow streets and colonial houses. The Nichols-Wanton-Hunter House, a restored colonial home, and The Breakers, former summer home of the American financier Cornelius Vanderbilt (see under VANDERBILT), are among the 18th- and 19th-century buildings now operated as museums in the city. Points of interest in the old section include Trinity Church (1726), the Old Colony House (1739), Redwood Library (1747), and Touro Synagogue (1763), the oldest synagogue in the U.S., and a national historical site. Newport is also the site of Salve Regina College (1934).

History. Newport was settled in 1639 by Antinomians (see ANTINOMIANISM), who were religious dissenters from the Massachusetts Bay Colony. Shipbuilding began in Newport in about 1646. During the colonial period, Newport was an important shipbuilding center and seaport, and a focal area for a profitable slave, rum, and molasses trade with the West Indies. Many religious refugees settled in the colony, with Jews and Quakers arriving first in about 1655. From 1776 to 1779, during the American Revolution, Newport was occupied by the British; this occupation resulted in the exodus of merchants and the decline of the shipping industry. Newport was first chartered as a city in 1784. After the American Civil War it became the leading summer resort for wealthy New York families. With Providence, it was one of the two capitals of Rhode Island until 1900. Pop. (1960) 47,049; (1970) 34,562.

NEWPORT, Great Britain, county borough of Monmouthshire, Wales, on the Usk R., about 18 miles S.W. of Monmouth. A deepwater port. Newport is one of the principal British outlets for coal and iron and steel products. Besides the shipping trade, major industries include the manufacture of structural steel and steel sheets, aluminum, chemicals, electrical products, and clothing. Newport has several 12th-century Norman ruins and a 20th-century cable cantilever bridge, the first of its kind in Great Britain. A charter granted the burgesses privileges of trade and self-government in 1385. In 1623, Newport was granted a royal charter by James I (q.v.), King of England. In 1839 it was the scene of the Chartist (see CHARTISM) insurrection by political reformers. Newport became a county borough in 1891. Pop. (1971) 112,048.

NEWPORT BEACH, city of California, in Orange Co., on a peninsula and scattered islands between Newport Bay and the Pacific Ocean, 18 miles S.E. of Long Beach. Industries include boat-building and the manufacture of marine products, electronic equipment, fiber-glass products, and tools. A headquarters for water sports and commercial fishing, the city has a boat and yacht harbor and facilities for aquatic sports. A causeway leads to Lido Isle, a residential resort in the bay. Planned as a beach resort in 1892, Newport Beach was incorporated in 1906. Pop. (1960) 26,564; (1970) 49,422.

NEWPORT NEWS, city and port of entry of Virginia, at the mouth of the James R., opposite Norfolk. With the cities of Norfolk and Portsmouth, Newport News forms the Port of Hampton Roads (q.v.), one of the principal commercial ports of the United States. Newport News has a large, well-protected harbor. Harbor facilities include piers, extensive warehouses, one of the largest dry docks, and one of the largest shipbuilding plants in the world. Principal exports from the port are coal and tobacco. The city contains railroad shops and factories producing chemicals, metal parts, and textiles. Seafood packaging and aeronautics are other important industries. In addition, the city is a major shipment center for bulk goods going from ship to rail.

History. The site of the city was first settled about 1620 by Irish colonists. The settlement was fortified by Federal troops during the American Civil War. Industrial development did not begin until 1880, when Newport News became the terminus of the Chesapeake and Ohio Railway. The shipbuilding industry began here in 1886. In 1896 the city was incorporated; today, it is part of the Newport News-Hampton

NEW ROCHELLE

metropolitan statistical area. In 1958 the neighboring city of Warwick was consolidated with Newport News. Pop. (1960) 113,662; (1970) 138,177.

NEW ROCHELLE, city of New York, in Westchester Co., on Long Island Sound, about 17 miles N.E. of central New York City metropolitan area. Manufactures include transportation equipment, electrical and nonelectrical machinery, chemicals, and clothing. The city is the site of the College of New Rochelle (1904) and Iona College (1940).

Among the points of interest is the home of the American political philosopher and writer Thomas Paine (q.v.), which now houses the Huguenot and Historical Association. New Rochelle was settled in 1688 by French Huguenots (q.v.), who named the site for the town of La Rochelle, France, where many of them had lived. The community was incorporated as a village in 1858 and as a city in 1899. Pop. (1960) 76,812; (1970) 75,385.

NEW SOUTH WALES, State of the Commonwealth of Australia, bounded on the N. by Queensland, on the E. by the Tasman Sea, on the S. by Victoria, and on the W. by South Australia. The chains of the Great Dividing Range extend across the State parallel to the coast. The highest elevation is Mt. Kosciusko (7316 ft.) near the Victoria border. The chief rivers are the Murray, Darling, and Murrumbidgee. The capital city is Sydney. Area, 309,433 sq.mi., including Lord Howe Island; pop. (1971 census) excluding aborigines, 4,589,600.

Grazing and mining are the most important industries. The chief mining products are gold, silver, coal, copper, tin, lead, zinc, and cobalt. Gold was first worked in 1851 near Bathurst. It is found in nearly all parts of New South Wales, but the most important districts are Bathurst, Lachlan, Mudgee, Peel, and Uralla. Silver (discovered in 1883) and lead mining are concentrated mainly at Broken Hill in the Albert mining district. The main coal-bearing rocks extend over an area of 24,000 to 28,000 sq.mi. around the seaport of Sydney.

Acreage under cultivation in the early 1970's totaled about 12,140,000. Principal crops (with production figures for the early 1970's) were: wheat (3,390,000 tons), corn (117,330 tons), barley (757,535 tons), oats (130,000 tons), potatoes (160,600 tons), tobacco (1250 tons), and rice (3,412,500 tons). Cane sugar and grapes are also grown, wine and sugar constituting important manufactures. Citrus fruits are raised in considerable number, oranges predominating. Grazing and livestock raising are the chief industries,

however; in the early 1970's sheep and lambs numbered about 70,600,000; cattle, 6,500,000; and pigs, 800,000. Forest area in New South Wales is estimated at 32,400,000 acres.

Manufacturing establishments in New South Wales numbered more than 14,000 in the early 1970's, the chief products being iron and steel, metal products, textiles, electrical appliances, automobiles, furniture, chemicals, and clothing.

In the early 1970's railroad mileage was about 6000, excluding about 85 mi. of private line chiefly in the mining districts. Roads and streets cover a total of about 130,000 mi. Education in State schools is free and compulsory for children between the ages of six and fifteen. Higher education is provided by five universities.

Executive power is nominally vested in a governor appointed by the British Crown; actual power is exercised by a premier and his cabinet. The State legislature consists of a parliament of two houses, namely, the legislative council of sixty members elected by a joint session of both houses and the legislative assembly whose ninety-four members are popularly elected.

New South Wales, the oldest colony of Australasia, was named in 1770 by the British explorer Captain James Cook (qq.v.). See AUSTRALIA: *History*.

NEWSPAPERS, publications for the most part issued and distributed daily or weekly, the function of which is chiefly the reporting of news. Newspapers generally also contain comments on the news, advocate various public policies, furnish special information and advice to readers in many fields, and frequently also publish comic strips and cartoons, short stories, and serialized novels. They are, in nearly all cases and in varying degrees, dependent for their income upon the publication of commercial advertising. Newspapers may be differentiated from newsmagazines, which serve many of the purposes of the newspaper, by their format and price. The average size of the sheet of the standard newspaper in the United States is 16 in. by 22 in., and of the small-sized or tabloid newspaper, 10 in. by 14 in.; that of the newsmagazine is considerably smaller. Newspapers differ further from newsmagazines in that newspapers are printed on rough-surfaced, so-called newsprint paper, and their pages are not bound or stapled, as are those of newsmagazines, but are printed with two pages on each side of a sheet and folded down the center. The price of a daily newspaper is also generally considerably less than that of a newsmagazine.

Before the invention of printing (q.v.) in the 15th century and for some time thereafter, news

was disseminated by word of mouth, by written letters, or by public notices. The earliest known examples of the last-mentioned form were the *Acta Diurna*, daily public news bulletins, most frequently containing military information, posted daily in Rome from the time of the statesman and soldier Gaius Julius Caesar. Copies of the bulletins were sent to the provinces of the Roman Empire. In the middle of the 16th century, the Venetian government posted news bulletins known as *Notizie Scritte*; permission to read them cost a small coin called a *gazetta*, from which later was derived the title or part of the title of many newspapers. After printing came into use, news was often published in pamphlets, or in single sheets devoted to one news item. The first newsheet of this type to be published regularly is believed to have been the German *Avisa Relation oder Zeitung*, which was established in 1609. The earliest daily newspaper in the world was the *Frankfurter Zeitung* (Frankfurt Newspaper), of Frankfurt, Germany, which began publication in 1615.

BRITISH NEWSPAPERS

The first English newspaper was *The Weekly News* (1622–41), and one of the earliest semi-weekly newspapers in England was the *Oxford Gazette* (established 1665). The last-named newspaper changed its name to *London Gazette* in 1666; it is still published twice a week as an official government journal concerned with the affairs of the royal court. The earliest daily newspaper in England was the *Daily Courant*, which began publication in 1702. Government censorship of the press, which began in 1622, tended to discourage the publication of newspapers, but the abolition of government censorship in 1693 greatly stimulated newspaper publication, and even the heavy government taxation of newspapers that prevailed in the 18th and first half of the 19th century did not prevent a growth in the number of newspapers in England; see PRESS, FREEDOM OF THE. Notable among 18th-century publishers of and writers for newspapers were the novelist Daniel Defoe, with his weekly, the *Review* (1704–13), later published three times a week; the essayist and playwright Richard Steele with the *Tatler* (1709); the essayist Joseph Addison, who with Steele published and wrote the *Spectator* (1711–12); the satirist and political pamphleteer Jonathan Swift, who was the principal contributor to the Tory newspaper the *Examiner* (established 1710); the essayist and lexicographer Samuel Johnson, with his weekly, the *Idler* (1758); and the politician and reformer John Wilkes with the *North Briton* (1761). See ENGLISH LITERATURE:

The Restoration and the 18th Century. Notable newspapers of the early 19th century in England were the *Morning Chronicle* (1769–1859); the *Morning Herald* (1781–1869); the weekly *Political Register* (founded 1802), published by the political reformer William Cobbett at a price of twopence, the first newspaper that sought to gain a wide circulation among the working classes; and the *Examiner*, founded (1808) by the writer and critic Leigh Hunt, and particularly distinguished for its drama criticism.

The abolition of the government tax on newspapers in 1855 brought about a general reduction in their prices and an increase in their circulation. The tendency toward low-priced newspapers was increased toward the end of the 19th century by the use of cheaper paper, made of wood pulp rather than of rag; by the use of improved printing machinery, which could print large editions quickly and reasonably; and, as circulation increased, by the growth of advertising in newspapers, which gave the publisher a source of revenue apart from that obtained by sales. The tendency finally resulted in the general establishment in England at the end of the 19th and beginning of the 20th century of the halfpenny daily newspaper. The movement for the establishment of this type of modern newspaper was initiated by Alfred Harmsworth, later Viscount Northcliffe, with his newspaper, the *Daily Mail* (founded 1896). In the 20th century, also, chains of newspapers were acquired by one publisher or publishing interest. Prominent among the publishing interests of this type in Great Britain were the group of publishers led by Northcliffe's brother Viscount Rothermere (1868–1940); the group controlled by Lord Camrose, formerly Sir William Berry (1879–1954), and his brother Sir Gomer Berry (1883–); and the group controlled by William (later Lord) Beaverbrook. A prominent 20th-century chain is the Thomson Newspapers group, controlled by Roy Herbert (Lord) Thomson (1894–), with fifty-four papers throughout the United Kingdom in addition to thirty-nine in Canada and twenty-four in the U.S.

The following is a list of important British newspapers of the 20th century. The outstanding newspapers of London are *The Times*, founded in 1785 and known until 1788 as the *Daily Universal Register*, today one of the best-known and most influential newspapers in the world; the *Evening Standard* (1870's), a continuation of the *Standard* (which had begun in 1827 as a morning paper, but was discontinued as such during World War I); the *Daily Telegraph and Morning Post*, begun originally as the

NEWSPAPERS

Daily Telegraph and Courier (1855) and the *Morning Post and Daily Advertising Pamphlet* (1772), and merged in 1937; the *Daily Chronicle* (1877); the *Evening News* (1881); the *Daily Mail* (1896); and the *Daily Express* (1900). Important British provincial newspapers include the *Guardian* (founded as the *Manchester Guardian* in 1821, but also printed in London since 1962 and therefore a paper of national standing), the *Liverpool Daily Post* (1853), the *Birmingham Post* (1857), and the *Yorkshire Post* (1866). Among the newspapers of mass circulation are the *Daily Express* (3,375,000 daily), the tabloid newspaper *Daily Mirror* (about 4,316,000), the *Daily Mail* (more than 1,710,000), and the Sunday newspaper *News of the World* (founded 1843, having in excess of 6,000,000 readers in the early 1970's).

UNITED STATES NEWSPAPERS

In a recent year the U.S. had approximately 1750 daily newspapers. More than 340 were morning papers with an estimated combined circulation of about 26,500,000; about 1450 were evening papers, with an average estimated aggregate circulation of over 36,600,000. The estimated aggregate circulation of all daily newspapers, including those published all day, was more than 63,100,000. At the same time the U.S. had about 625 Sunday newspapers (Sunday editions of daily newspapers), with an estimated aggregate circulation of almost 51,700,000.

The influence of newspapers in forming public opinion in politics, economics, ethics, and many other aspects of life has led to an ever-increasing need for thorough training of those who intend to enter the newspaper profession. In answer to this need in the U.S., a large number of schools of journalism have been established in American universities and colleges in recent years; see JOURNALISM.

Early History. In America the forerunner of the newspaper was the newsletter written in the 17th century by professional writers for patrons in England. An immediate predecessor of the newspaper was a newsheet known as *Publick Occurrences*, published for just one issue in Boston in 1690; difficulties with censorship prevented its continuation. The first continuously published American newspaper was *The Boston News-Letter*, established in 1704 by John Campbell (1653–1727?), postmaster of Boston. The paper was the outgrowth of the letters containing news information that he had written to the various colonial governors of New England; it was published until 1776.

Among other early American newspapers, which were for the most part published weekly,

The Boston News-Letter

Selections from Issues of 1704-1707

Windser, September 14, 1704.

His day Captain Trevar, arrived here; he sent *Exelsior* by Sir George Rusk from the Fleet with Letters to *Herby* *Highness*, dated on Board the *Royal Caroline* off Cape St Vincent, August 21 O. S. 1704. We contain the following Account.

On the 9th Instant, coming from watering our Ships on the *Cove of Barbary*, returning, with little Wind Easterly, our Scouts to the Windward, saw the Signals of freeing the Enemy's Fleet, which, according to the Account they gave, consisted of 6 Sail, and were about to Leagues to Windward of us. A Council of Flag-Officers was called, wherein it was determined to lay to the Eastward of *Gibraltar* to receive and engage them; But perceiving that Night, by the Reports of their Signal-Guns, that they were wrought from us, we followed them in the Morning with all the Sail we could make, and

On the 11th we forced one of the Enemy's Ships ashore near *Fuergale*; the Crew quitted her, let her on Fire, and she blew up immediately. We continued still purifying them; and the 12th, still hearing any of their Guns all Night, nor seeing any of their Scouts in the Morning, our Admiral had a Jealousie they might make a Double, & by the help of their Gallies slip between us and the Shore to the Westward; for that a Council of War was called, wherein it was resolved, That in case we did not see the Enemy to night, we should make the best of our way to *Gibraltar*; but flanding in to the Shore about Noon, we discovered the Enemy's Fleet and Gallies to the Westward, near *Cape Malaga*, going away large. We immediately made all the Sail we could after them, and continued the Chase all Night.

On Sunday the 13th in the Morning, we were within 3 Leagues of the Enemy, who brought to with their Heads to the Southward, the Wind being Easterly, formed their Line, and lay to receive us. Their Line consisted of 52 Ships, & 24 Gallies; they were very strong in the Center, & weaker in the Van and Rear, to supply which, most of the Gallies were ordered into those Quarters. In the Center was Monsieur de Suffaut with the White Squadron; in the Van the Van and Blue; and in the Rear the Blue; each Admiral had 5 Ships, and Rear-Admirals our Line consisted of 5 Ships. The Admiral & Rear-Admirals *Bright & Dull* being in the Center, *Sir Gladly Shovel* and *Sir John Lowe* led the Van, and the *Dutch* the Rear.

The Admiral ordered the *Swallow* and *Parrot*, with the *Lark* and *Nautilus*, and 2 Fire-ships, to be in the Windward of us, that in case the Enemy's Van should push through our Line with their Gallies and Fire-ships, they might give them some assistance.

As the sun rose on the Enemy on the 27th of June, a little after a Clock, when being about half Battle, they from there, they let all their Shots at us, and seemed to intend to stretch a head, and wound us; so that our Admiral, after firing a Chace Gun at the Enemy's Head, sent a Shot at the Enemy's Breast, at the notice, put the Signal, "For him, who they thought fell very heavy on the Royal Caterpillar, the 2d. Company of the *Savagery*. About 2 in the afternoon, the Enemy's Van gave way to ours, & the British sent help of their Gallies to the *Leward*. In the Night the Wind shifted to the *Northward*, & in the Morning to the *Westward*, which gave the Enemy the Wind of us: We lay by all day doing the Enemy the Wind and another, repairing our Defects, & at Night they sent a flood to the *Northward*.

On the 15th in the Morning the Enemy was got
of five Leagues to the Windward of us; but a
little before Noon we had a Breeze of Wind Easterly,
with which we bore down on them till 4 o'Clock
Afternoon: It being too late to chase, we brought
to, and lay by with our Heads to the Northward all
night.

On the 16th in the Morning, the Wind being still
Easterly, hazy Weather, and having no sight of the
Enemy, or their Scumers, we Ell'd and bore away to the
Westward, supposing they would have gone away for
Cadiz; but being advised from Gibraltar, and the
Cust of Barbary, that they did not pass the Straights,
we concluded they had been so severely treated,
to oblige them to return to Thoulon.

Single Island View.

here one *Benjamin Church*, who sailed hence Master of a small Sloop bound for *Antigua*, the 6th of August last, and on the 18th, in the Lat. of 34, met with the same Storm that the *Jamaica Fleet* met with on (said day), which overtook the Sloop, and the people kept on the Bowprit from Saturday till Monday when the Sloop righted, but lost her Mail, and through their indutry they freed her, the Wind hanging Easterly, they drove ashore on *Cape May*, and to live all their lives.

Philadelphia, August 3. Yesterday arrived here Capt. Puckle from London about 14 weeks passage.

Selections of news items from America's first continuously published newspaper, The Boston News-Letter.

were the *Gazette* (Boston, established 1719); *The American Weekly Mercury* (Philadelphia, 1719); *The New England Courant* (Boston, 1721); the *Pennsylvania Gazette* (Philadelphia, 1728), edited and partly owned by the statesman, scientist, and philosopher Benjamin Franklin; and the New York *Gazette* (1725), New York City's first newspaper. In 1773 John Peter Zenger founded the New York *Weekly Journal*, a newspaper that was critical of the dishonest and oppressive policies of the British colonial administration. He was arrested and imprisoned on charges of seditious libel. Zenger was freed after a trial that established a precedent for libel proceedings and victory for freedom of the press.

The earliest American daily newspaper was the *Pennsylvania Evening Post and Daily Advertiser*, published in Philadelphia in 1783. The first daily newspaper in New York City was the New York *Daily Advertiser*, established in 1785 by Francis Childs (b. 1764). It was followed by the *Minerva* (1793), which had as its first editor the lexicographer Noah Webster; this journal later took the name *Globe and Commercial Advertiser*, under which title it was published until 1923.

Development of New Reportorial Tactics.

Notable among American newspapers of the

early 19th century were the *Palladium* of Boston, the first in America to make a practice of sending reporters to obtain news instead of publishing merely the news sent to its office from various sources; the *New York Evening Post* (later the *New York Post*), the oldest newspaper in the U.S. continuously published without change of name, established in 1801 and edited at one time by the poet William Cullen Bryant; the *Daily Evening Transcript* (Boston, 1830); the *Liberator* (Boston, 1831), noted for the strong abolitionist views of its editor, William Lloyd Garrison; and the *Sun* (New York, 1833), the first paper selling for one cent and specializing in reporting sensational news for purposes of securing large circulation.

The middle and later years of the 19th century are particularly noted in the history of journalism for the work of a number of outstanding publishers and editors. One of them was James Gordon Bennett, who in 1835 founded the *New York Herald*, which he made into one of the most widely read newspapers of the time, at first by emphasis on lurid and scandalous news items, and later by an unprecedentedly thorough coverage of foreign news. The most distinguished editor of the period, noted for his editorials in which he supported the rights of labor and of women, fought slavery, and backed the Union cause in the Civil War, was the journalist Horace Greeley. He founded the *New York Tribune* in 1841 and was its owner and editor until 1872. Another of the leading publishers

and editors of the century was the journalist Joseph Pulitzer, noted for his dynamic editing of the *New York World*, which he acquired in 1883 and which until it ceased publication in 1931 was in the front rank of American newspapers supporting the principles of the Democratic Party (q.v.). The *New York Times*, established in 1851, became in the hands of Adolph Simon Ochs, who acquired it in 1896, one of the foremost newspapers in the world, remarkable for the thoroughness of its reporting of all aspects of the daily news, both domestic and foreign.



Adolph S. Ochs was the publisher of *The New York Times* from 1896 until his death in 1935. He stressed nonpartisan, almost clinical news reporting.

International News Photos



Horace Greeley, founder of the *New York Tribune* in 1841, was one of the leading editors of the mid-19th century.

UPI

During the last two decades of the 19th century a great increase in department-store and other forms of display advertising, rates for which were based on the number of copies of the newspaper sold, led to unusually intense competition for circulation. To obtain readers, newspapers began to vie with one another in the publication of sensational and scandalous news stories. The type of journalism thus created was popularly known as yellow journalism; its chief practitioners were two New York newspaper publishers, Joseph Pulitzer in the *New York World* and William Randolph Hearst in the *New York Journal*, edited by Arthur Brisbane.

Twentieth-Century Trends. The first half of the 20th century was marked in American newspaper publication by three outstanding tenden-



William Randolph Hearst, head of the far-flung Hearst newspaper chain, directed his syndicate until his death in 1951 at the age of 88. UPI

cies: one toward the consolidation of newspapers; another toward the establishing of chains of newspapers; and the third toward the small-sized newspaper popularly known as a tabloid. **MERGERS AND CLOSINGS.** Because of growing competition among newspapers for circulation and advertising and the increasing costs of successfully conducting a newspaper enterprise, it became economically unsound for many newspapers to continue operation. In many cases those that were losing money were purchased by publishers of successful newspapers in the same city, who merged them with their own newspaper properties. The New York publisher Frank Andrew Munsey was particularly noted for the number of consolidations he effected. In 1916 he merged the New York *Press* and the *Sun*, under the name of the latter; in 1923 he consolidated the *Globe and Commercial Advertiser* with the *Sun*. In 1920 he bought the New York *Herald* and four years later sold it to the New York *Tribune*, which thenceforth was published as the *Herald Tribune* (until 1966, when it became the *World Journal Tribune* as the result of a merger; the *World Journal Tribune* was discontinued the following year). Examples of similar consolidations elsewhere in the U.S. were the merging in Boston (1912) of the Boston *Herald* with the Boston *Traveler*, and the absorption

(1917) by the *Herald* of the Boston *Journal*; and the consolidation in Philadelphia of the *Evening Public Ledger* with the *Evening Telegraph* (1918), the *Press* (1920), and the *Philadelphia North American* (1925).

Since World War II, while overall newspaper circulation has gone up and many new, suburban and small, city newspapers have been founded or have grown substantially, many metropolitan dailies have been discontinued. Between 1945 and 1965, for example, the number of metropolitan dailies in the ten largest metropolitan areas of the U.S. declined from about fifty to about thirty. Included among the discontinued dailies were such famous newspapers as the New York *Sun*, the New York *Daily Mirror*, the Boston *Post*, the Washington *Times Herald*, the Chicago *Times*, the Detroit *Times*, the Philadelphia *Record*, the San Francisco *Call-Bulletin*, the Los Angeles *Examiner*, the Pittsburgh *Sun-Telegraph*, and the Boston *Herald-Traveler*. The principal reasons for the discontinuation of these dailies appear to have been loss of advertising revenue to competing dailies or to television and other media, labor difficulties, and the rising cost of equipment, labor, and material. Publishers of surviving metropolitan dailies, faced with strong competition from other papers in their areas for advertising revenue, and from flourishing suburban papers in their outlying areas, have tried either to combine all the functions of competing metropolitan dailies (except the editorial staffs) or to acquire the suburban papers. Presently, however, both practices are under attack by the United States Department of Justice, which holds that such arrangements can violate Federal antimonopoly legislation.

In spite of the consolidations and closings, ample evidence indicates that newspaper publishing generally is a profitable business. Circulation has increased from 51,000,000 in 1946 to 63,147,280 in 1973. Advertising volume has increased from \$1,900,000,000 in 1949 to \$7,800,000,000 in 1974. This volume represented more than 33 percent of total national expenditures on advertising.

Because most newspapers are privately owned and do not issue annual reports, it is difficult to tell how much they earn. The names of the newspaper groups listed below, however, now appear in daily stock market quotations as publicly owned enterprises. Their earnings have compared favorably with those of general industrial investments. Further evidence that newspapers are regarded as profitable investments is provided in the sale prices of these



A newsroom of the Chicago Tribune, one of America's major newspapers.

Chicago TRIBUNE

properties. In 1967 the Knight newspaper group, for example, paid \$55,000,000 for the Philadelphia *Inquirer* and the Philadelphia *Daily News*. Also in 1967 the Newhouse group for \$51,000,000. When the Los Angeles *Times* offered to pay \$91,500,000 in stock for the Dallas *Times Herald* and its broadcasting interest, it participated in the trend toward group ownership.

Major Chains. The principal chains, or groups, of newspapers in the U.S. are the Knight-Ridder newspapers, the largest group in terms of circulation; the Chicago Tribune newspapers, second; and the Newhouse newspapers, third. The Knight-Ridder chain, formed in 1974, includes thirty-five dailies, among them the Philadelphia *Inquirer* (daily, over 454,000; Sunday, over 819,000), the Philadelphia *Daily News* (daily, 262,000), the Miami (Fla.) *Herald* (over 427,000), the Detroit *Free Press* (about 612,000), and the Charlotte (N.C.) *Observer* (about 176,000). In a recent year the Chicago Tribune group included six dailies in the States of Illinois, New York, and Florida; among them are the Chicago *Tribune* (daily, 839,000; Sunday, over 1,150,000) and the New York *Daily News* (daily, over 2,100,000; Sunday, about 2,890,000). The Newhouse chain comprised twenty-seven newspapers in ten States; among the papers were the Cleveland *Plain Dealer* (daily, about 403,000; Sunday, over 530,000) and the Saint Louis (Mo.) *Globe-Democrat* (daily, over 284,000; weekend, about 285,000).

Other important groups include the Hearst, Scripps-Howard, Gannett, and Copley newspapers. In a recent year the Hearst chain comprised eight daily newspapers in seven major cities; among the papers were the Boston *Herald-American* (daily, except Sunday, about 372,000); the San Francisco *Examiner* (evenings,

except Sunday, about 180,019) and *Examiner & Chronicle* (Sunday, about 668,000); and the Los Angeles *Herald-Examiner* (daily, over 452,000; Sunday, nearly 465,000). The Scripps-Howard group comprised at this time seventeen newspapers in fifteen cities. The papers included the Cleveland *Press* (daily, nearly 374,000); the Cincinnati *Post & Times-Star* (daily, over 210,000); the Pittsburgh *Press* (daily, over 287,000; Sunday, about 695,000); and the *Commercial Appeal* of Memphis, Tenn. (daily, about 216,000; Sunday, about 287,000). The Gannett chain comprised about sixty newspapers in sixteen States, which included New York, New Jersey, Connecticut, Illinois, Florida, and California. The Copley group consisted of fifteen dailies in Illinois and California.

Tabloids. The tabloid differs from the standard newspaper in its physical size, the depth of its news coverage, and the number of its illustrations; the tabloid is usually about half the standard-sized paper, reports the news in more condensed or shortened versions, and offers the reader many more illustrations. The first American tabloid newspaper was the *Illustrated Daily News*, established in New York City in 1919; it later changed its name to the *Daily News* and became the largest newspaper in the U.S., with a daily circulation of over 2,000,000 and a Sunday circulation of almost 3,000,000. Another leader in the tabloid field is the Chicago *Sun-Times* (established 1948 as a merger of the *Times*, founded in 1928, and the *Sun*, founded in 1941), with a circulation of about 568,000 daily and more than 717,000 on Sunday. Until it ceased publication in 1963, the tabloid New York *Mirror* (established 1924) had a circulation of about 850,000 daily and 1,150,000 on Sunday.



The New York Mirror, a major tabloid newspaper, ceased publication in 1963. A pressman inspects the last edition of the newspaper.

World Wide

Independents, Newsmagazines, and Supplements. Among the leading newspapers in the U.S. that are not members of a chain, exclusive of tabloid newspapers treated above, are the *Los Angeles Times* (daily, 1,110,000; Sunday, 1,189,000); the *New York Times* (daily, over 834,000; Sunday, about 1,434,000); the *St. Louis Post-Dispatch* (daily, about 298,000; Sunday, 494,000); and the *Boston Christian Science Monitor* (daily, about 186,000). Among important weekly newsmagazines are *Time* (established 1923) and *Newsweek* (established 1933). The Sunday editions of many newspapers contain a magazine or comics supplement that the newspaper does not publish itself but buys from a related or an outside publishing organization. Among the Sunday supplements of this type are *Metro Sunday Comics*, which appears in about sixty Sunday newspapers; *Puck—The Comic Weekly*, which appears in about 100 newspapers; *Parade*, which serves over 100 newspapers; and *Family Weekly Magazine*, which is distributed with about 290 small- and medium-sized newspapers.

Foreign-Language Newspapers. The U.S. has had many newspapers published in foreign languages, but they are now diminishing in number. They include at present the *New York Jewish Daily Forward* (daily circulation, about 45,000; Sunday, about 51,000); the *New York Il Progresso Italo-Americano* (daily, about 72,000); the *New York Staats-Zeitung und Herold* (Ger-

man; daily, about 10,100; Sunday, about 25,000); the *Chicago Svenska Amerikanaren Tribunen* (Swedish; weekly, over 20,000); the *Honolulu New China Daily Press* (daily, over 9000); the *Chicago Dziennik Zwiagkowy* (Polish; daily, 27,500); and the *New York Diario-La Prensa* (Spanish; daily, over 77,000; Sunday, about 67,000).

FOREIGN NEWSPAPERS

Although the newspapers of the European continent usually strongly emphasize a political point of view, freedom of the press is in most instances as developed on the Continent as in Great Britain and the U.S.; the newspapers of countries under dictatorial rule, however, are subject to strict censorship and suppression.

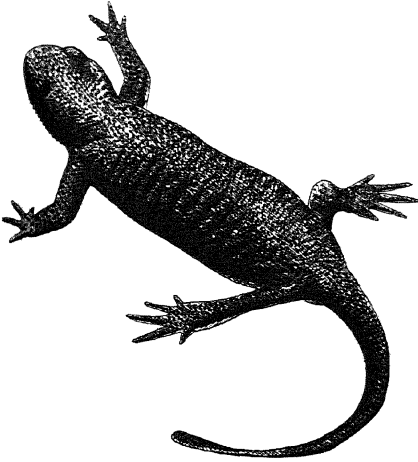
France is an excellent example of the variety and freedom of the European press, for French papers represent many different political points of view. Among the noted newspapers of France are *France-Soir*, *Le Figaro*, *Le Parisien Libéré*, *L'Aurore*, *Le Monde*, and *L'Humanité*, all published in Paris; *Ouest France* of Rennes; *Le Progrès de Lyon* of Lyon; *Sud-Ouest* of Bordeaux; and *La Voix du Nord* of Lille. Other important or popular newspapers of Europe are *Berliner Morgenpost* and *Berliner Zeitung am Mittag* of West Berlin and East Berlin, respectively; *Süddeutsche Zeitung* of Munich; *Westdeutsche Allgemeine Zeitung* of Essen; *Bild-Zeitung* of Hamburg; *L'Osservatore Romano*, an organ of the Vatican (see VATICAN CITY), published in Rome; *Stampa-Sera* of Turin; *Corriere della Sera* and *Il Giorno*, of Milan; the Italian political papers *Il Popolo* (Christian-Democrat), *Avanti!* (Socialist), and *L'Unità* (Communist), the first published in Rome and the last two published in Rome and Milan; *Arbeiter-Zeitung* and *Die Presse* of Vienna; *Nép Szabadság* of Budapest; and *Izvestia* ("News"), the leading government paper in the Soviet Union, and *Pravda* ("Truth"), of Moscow, the chief paper of the Communist Party.

Outstanding non-Continental or Commonwealth of Nations (q.v.) newspapers are the *Irish Times* and the *Evening Herald* of Dublin, Ireland; *La Presse* of Montréal and the *Toronto Globe and Mail*, both of Canada; and the *Sydney Daily Telegraph* and *Melbourne Herald* of Australia.

La Prensa and *La Nación* ("The Nation"), published in Buenos Aires, Argentina, *Santiago Mercurio* of Chile, and *El Universal* of Mexico City are outstanding South and Central American newspapers.

See separate articles for persons whose birth and death years are not given. E.F.E.

NEWT, or EFT, common name applied generally to many small, semiaquatic salamanders of the family Salamandridae. The many species in this family are widely distributed throughout the temperate regions of the Northern Hemi-



Rough-skinned Newt, *Triturus granulosus*

sphere. They are slender, active, and when adult usually about 3 to 4 in. long. The common newt of eastern and central United States is *Diemictylus viridescens*, a tannish-green species, spotted on the sides with blotches of red surrounded by black, and spotted below with black. This amphibian inhabits thickly vegetated ponds and streams, and feeds on aquatic snails and insects. The female attaches its sticky eggs individually to aquatic plants; the newly hatched larvae are equipped with gills that become rudimentary when the larvae are about 1 in. long. At this time, the larvae, which are brick red in color, and which are consequently known as "red efts", leave the water, and spend the next few years on land, living under stones and logs in damp, wooded regions. The larvae eventually return to the water, develop the adult coloration, and spend the rest of their lives in an aquatic habitat. Another common American species is the giant newt, *Taricha torosa*, which attains a length of over 6 in. Among the common European species are the spotted newt, *Triturus vulgaris*, the crested newt, *T. cristatus*, the male of which develops a crest during the breeding season, and the palmate newt, *T. palmipes*. See AMPHIBIA.

NEW TESTAMENT. See BIBLE: *The Growth of the Bible: The New Testament.*

NEW THOUGHT, idealistic movement in religious and philosophical thinking that developed in the United States, particularly in New England, early in the second half of the 19th century; see IDEALISM. This movement, from which evolved various theosophic and psychotherapeutic systems (see THEOSOPHY), such as the so-called Higher Thought, Mental Science, Metaphysical Healing, and Practical Christianity, had numerous affinities with the transcendental philosophy (see TRANSCENDENTALISM) of the American philosophers Amos Bronson Alcott, Ralph Waldo Emerson, and Henry David Thoreau (qq.v.) and with the mystical doctrines of Platonism (see MYSTICISM; PLATO), Neoplatonism, and Vedanta (qq.v.). The chief tenets of New Thought are that God is omnipotent and omnipresent, spirit is the ultimate reality, the true selfhood of man is divine, divinely attuned thought is a positive force for good, disease is mental in origin, and right thinking has a healing efficacy. The therapeutic theories of New Thought received particular emphasis in the Divine Science Church, which taught that God is the sole reality, sickness is the result of the failure to realize this truth, and healing is accomplished by the affirmation of man's oneness with God. The first exponent of metaphysical healing in the U.S. was Phineas Parkhurst Quimby (1802-66). Another practitioner was John Bovee Dods (1795-1862), who also wrote several books expounding the thesis that disease originates in the electrical impulses of the nervous system and is curable by a change of belief. The mental science of the Swedenborgian minister (see SWEDENBORG) Warren Felt Evans (1817-89), a follower of Quimby's, also contributed to the development of this movement. New Thought is customarily differentiated from Christian Science (q.v.) and medical psychotherapy (see PSYCHOTHERAPY).

NEWTON, city in Iowa and county seat of Jasper Co., about 28 miles N.E. of Des Moines. Manufactures include foundry products, construction equipment, and washing machines. Newton is the birthplace of the American writer Emerson Hough (1857-1923). His home, built in 1855, is still standing. Settled in 1846, the city was incorporated in 1857. Pop. (1960) 15,381; (1970) 15,619.

NEWTON, city in Kansas, and county seat of Harvey Co., in the fertile valley of the Arkansas R., 22 miles N. of Wichita. It is served by railroad and is a railroad division point with extensive railroad shops. The city is the trading, distributing, and shipping center of an area producing wheat and other grains, alfalfa, and dairy prod-

NEWTON

ucts. Among the industrial establishments are large grain elevators, flour mills, creameries, and plants manufacturing house trailers and agricultural machinery. The city is the site of Bethel College (Mennonite), established in 1887. Newton was settled in 1871 and incorporated in 1872. Many of the early settlers were German Mennonites who immigrated to the site from Russia, bringing with them quantities of Turkey red wheat for seed, marking the beginning of hard winter wheat cultivation in Kansas. Pop. (1960) 14,877; (1970) 15,439.

NEWTON, city of Massachusetts, in Middlesex Co., on the Charles R., adjoining Boston. Industries include the manufacture of rubber goods, electrical equipment, and machinery. The city is the site of Andover Newton Theological School, founded in 1807. It was incorporated as a town in 1688 and as a city in 1873. The city today comprises 14 villages. Pop. (1960) 92,384; (1970) 91,066.

NEWTON, Sir Isaac (1642–1727), English mathematician, physicist, and astronomer, born in Woolsthorpe, near Grantham, Lincolnshire, and educated at Trinity College, University of Cambridge. He was appointed a fellow of Trinity College in 1667 and professor of mathematics in 1669.

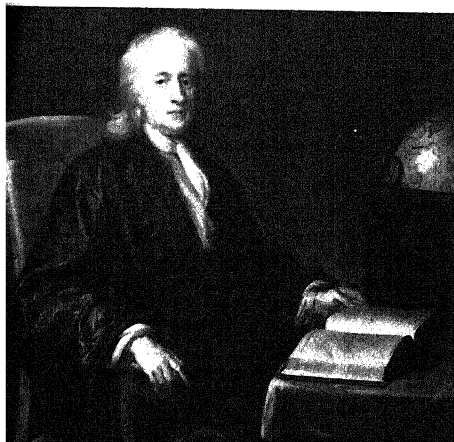
Early Insights. By the age of twenty-five Newton had made many of the discoveries and begun work on the formulations of physical theory for which he later became recognized as one of the greatest scientific geniuses of all time. As early as 1666 he conceived the idea of universal gravitation (see GRAVITATION), and calculated, on the basis of the empirical laws of planetary motion formulated by the German astronomer Johannes Kepler (q.v.), that the gravi-

tational force between two masses is inversely proportional to the square root of the distance between them. According to a popular story, Newton conceived the idea of universal gravitation after watching an apple fall to the ground in his garden. The story was first circulated by the French philosopher Voltaire (q.v.), who is reputed to have heard it from Newton's grandniece. Newton did not fully work out the law of gravitation until 1685, when he constructed a rigid mathematical proof of the theory, confirming it with known measurements of the masses and relative distances of the members of the solar system. As a mathematical interpretation of natural phenomena in accordance with well-defined physical principles the law of universal gravitation was the first great systematization of knowledge in the physical sciences; see PHYSICS: History.

Principles of Mechanics. Newton's investigations of gravitational forces were an important part of his work on the fundamental principles of mechanics (q.v.). The concepts of mass and force were implicit in the work of the Italian scientist Galileo Galilei (q.v.), but Newton made the first successful formulation of the general laws governing the motion of matter; see NEWTON'S LAWS OF MOTION. His work in mechanics was recorded in *Philosophiæ Naturalis Principia Mathematica* ("Mathematical Principles of Natural Philosophy", (1687), which is considered one of the greatest works in scientific literature. Newton's mechanics, as stated in the *Principia*, summed up and systematized the work of the scientists of the 17th century and formed the groundwork which the sciences of astronomy and mechanics developed for the following two centuries. The mechanistic view of the universe, implicit in Newtonian mechanics and particularly in an orderly system of heavenly bodies rotating in their orbits in accordance with a mathematical law, also greatly influenced the trend of philosophic thinking in the following centuries. A more comprehensive view of the physical universe, which did away with the concepts of absolute space, absolute time, and forces acting at a distance, necessary to Newtonian mechanics, was introduced with the theory of relativity (q.v.) developed by the 20th-century German-American physicist Albert Einstein (q.v.). Although the relativistic view is accepted today in explaining ultimate physical concepts, Newtonian mechanics is still adequate in predicting physical phenomena to a high degree of accuracy and in solving practical problems in physics and engineering. See CELESTIAL MECHANICS.

Sir Isaac Newton

National Portrait Gallery, London



Mathematics and Optics. Newton established the binomial theorem (see **BINOMIAL**), developed the theory of equations, and also a method of calculus (q.v.), which he called *fluxions*; see **EQUATIONS, THEORY OF**. Although he invented his system of fluxions in 1666 and used it in mathematical investigations of gravitational force, Newton did not publish his work until 1693. The German philosopher Baron Gottfried von Leibniz (q.v.), who published a different method of calculus in 1684, claimed prior invention, but it is evident that each investigator independently developed different systems of the calculus.

Newton also made important contributions to optics (q.v.). He demonstrated, by passing light through two properly arranged prisms, that white light is composed of all the colors of the spectrum. Because he erroneously concluded that the dispersion of light into colors by the lens of a telescope could not be prevented, he invented a new type of telescope, the reflecting telescope, in 1668. He developed the laws of refraction and reflection and proposed a corpuscular theory of light; see **LIGHT**. His work in optics is summed up in *Optics* (1704).

In 1696 Newton accepted the post of warden of the mint. Three years later he became master of the mint and resigned his professorship at Trinity College. In 1703 he became president of the Royal Society and was reelected annually until his death. He was knighted in 1705.

NEWTON'S LAWS OF MOTION, three basic laws of classical mechanics, formulated by the English physicist and mathematician Isaac Newton (q.v.), on the relation of force to motion. According to the first law, a body at rest remains at rest and a body in motion continues to move at constant speed along a straight line unless, in either case, the body is acted upon by an outside force. The second law is in two parts and states that an outside force acting on a body causes the body to accelerate in the direction of the line of action of force; the acceleration is directly proportional to the force and inversely proportional to the mass of the body. Newton's third law states that for every action there is an equal and opposite reaction. See **ACCELERATION, DYNAMICS; FORCE; MASS; MECHANICS**.

Newton's laws formed the basis of dynamics until the early 20th century, when these laws were unable to explain motions at the velocities of light or the mechanics of bodies of the size of the atom or the electron. Twentieth-century concepts of relativity and quantum theory (qq.v.) have generally replaced Newtonian dynamics. See also **ATOM and ATOMIC THEORY; ELECTRON; QUANTUM MECHANICS**.

NEW ULM, city in Minnesota, and county seat of Brown Co., on the Minnesota R., about 77 miles s.w. of Minneapolis. Primarily a marketing center, cheese, flour, and plastic products are made there. Dr. Martin Luther College (1884) is located here, and nearby is Cottonwood State Park. Founded in 1854, New Ulm was incorporated as a village in 1857 and as a city in 1876. Pop. (1960) 11,114; (1970) 13,051.

NEW WESTMINSTER, city and port in British Columbia, Canada, just upstream from Vancouver on the Fraser R. Headquarters of the Fraser R. fishing fleet, New Westminster is the largest freshwater port in British Columbia. It was the capital of colonial British Columbia from 1859 to 1866. Pop. (1976) 38,393.

NEW YEAR'S DAY, first day of the year, January 1 in the Gregorian calendar. In the Middle Ages most European countries used the Julian calendar (see **CALENDAR**) and observed New Year's Day on March 25, called Annunciation Day and celebrated as the occasion on which it was revealed to Mary (q.v.) that she would give birth to the Son of God. With the introduction of the Gregorian calendar in 1582, Roman Catholic countries began to celebrate New Year's Day on Jan. 1. Scotland accepted the Gregorian calendar in 1600; Germany, Denmark, and Sweden about 1700; and England in 1752. Traditionally the day has been observed as a religious feast, but in modern times the arrival of the New Year has also become an occasion for spirited celebration and the making of personal resolutions about future conduct. The Jewish New Year is called Rosh Hashanah (q.v.), or the Feast of Trumpets, and is prescribed by the Old Testament as a holy sabbath (q.v.). It is celebrated on the first and second days of the month of Tishri (generally September). The Chinese celebrate New Year's Day sometime between Jan. 10 and Feb. 19 of the Gregorian calendar. It is their most important holiday.

NEW YORK, one of the Middle Atlantic States of the United States and the second most populous State in the Union, bounded on the n. and n.w. by Lake Ontario and the Saint Lawrence R. and by the Canadian province of Québec; on the e. by Vermont, Massachusetts, and Connecticut; on the s. by the Atlantic Ocean, New Jersey, and Pennsylvania; and on the w. by Pennsylvania, Lake Erie, and the Niagara R. In shape, the mainland portion of New York resembles a right triangle, with the hypotenuse extending from the s.w. to the n.w. corner of the State. It measures about 330 mi. from e. to w. and about 310 mi. from n. to s. The coastline, including that of the islands and all tidal bays and inlets, totals

NEW YORK

1412 mi. The coastline of the State on the Great Lakes totals about 275 mi.

Area (30th State in rank)	49,576 sq. mi.
Land	47,831 sq. mi.
Inland water	1,745 sq. mi.
Population	(1970, 2nd in rank) 18,941,866
	(1960, 1st in rank) 16,782,304
	(1950) 14,830,192
Altitude	sea level to 5344 ft.
Capital	Albany (1970) 114,873
Largest city	New York (1970) 7,895,563
Entered Union (11th of original 13)	July 26, 1788
Nickname	The Empire State
Motto	Excelsior (Ever Upward)
Flower	rose
Bird	bluebird
Gem	garnet

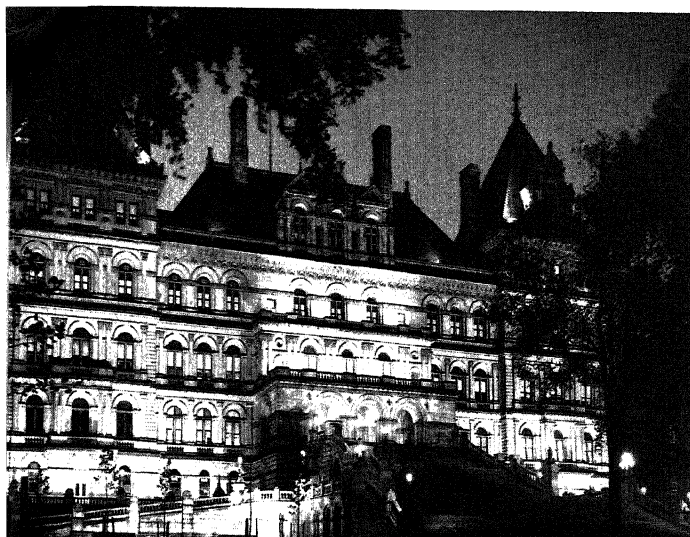
THE LAND

The terrain of New York is highly diversified. North of the valley of the Mohawk River (q.v.), the dominant topographic feature is the Adirondack Mountains (q.v.); Mt. Marcy (5344 ft.) is the highest point in the State, and a number of other peaks of the range exceed 4000 ft. From the main crest of the Adirondacks, the mountains slope to peripheral lowlands. In the E. these lowlands comprise the valley of the Hudson River (q.v.), the chief river of the State, and the plains adjacent to Lake Champlain (q.v.), which forms part of the Vermont-New York boundary. The N., S., and W. lowlands are respectively those of the St. Lawrence R. valley, the Mohawk R. valley, and the Lake Ontario plain. Most of the region S. of the Mohawk valley falls within the Appalachian plateau; covering more than one half of the area of the State, the plateau slopes upward from N. to S. and from W. to E. and attains its maximum elevation in the Catskill Mountains (q.v.). Slide Mt. (4205 ft.) is the highest peak of

this uplift. In the W. and N.W. the plateau merges with the plains of Lakes Ontario and Erie. South of the Catskills are the Shawangunk Mts., with elevations up to 2000 ft., and the Palisades (q.v.), a line of traprock cliffs along the W. side of the Hudson R. The chief topographic feature of that portion of the State E. of the Hudson is the foothills and extensions of the Berkshire Hills (q.v.), which project southward into Manhattan Island. Both Long Island and Staten Island fall within the Atlantic coastal plain.

Rivers and Lakes. In addition to the rivers already mentioned, the principal streams of New York are the Genesee, Oswego, and Black rivers, which drain into Lake Ontario; the headwaters of the Delaware River and the Susquehanna River (qq.v.); and a portion of the Allegheny River (q.v.). The State is traversed by numerous lesser streams, including various affluents of the chief rivers. At many points certain of the rivers pass through precipitous gorges and are broken by rapids and falls. The most spectacular cataract is Niagara Falls (q.v.). Other famous waterfalls of the State are Portage Falls and Genesee Falls, in the Genesee R.; Chittenango Falls, in Chittenango Creek; Cohoes Falls, near the mouth of the Mohawk R.; Enfield Falls, in Tompkins County; and Ausable Falls, in Essex County.

One of the outstanding features of the hydrography of New York is the large number of lakes. Besides Lake Champlain, which lies partly in Vermont, and Lakes Erie and Ontario, the major lakes are Cayuga, Seneca, and Keuka, situated in the W. and comprising part of the Finger Lakes; Lake Chautauqua, in the SW; lakes



A night view of the New York State capitol, located in Albany, N.Y.

New York State
Dept. of Commerce

INDEX TO MAP OF NEW YORK

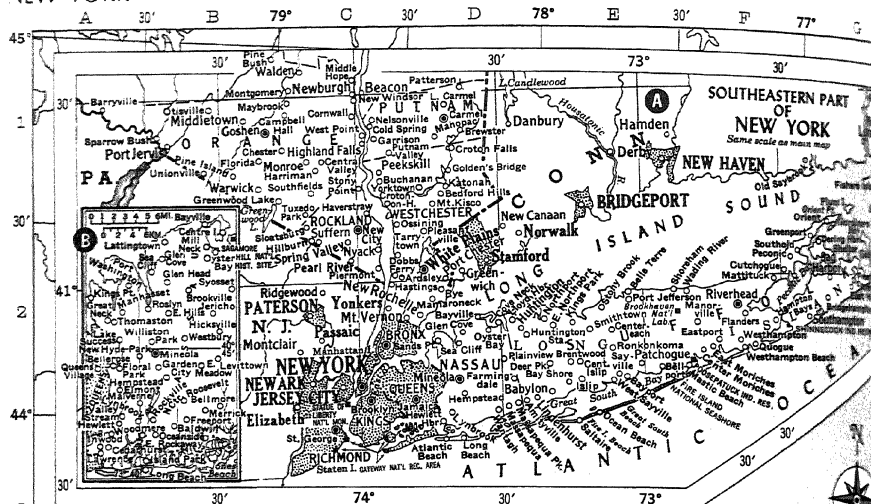
Cities and Towns

Adams	J 3	Cattaraugus	C 6	Fishkill	N 7	Johnstown	M 4
Addison	F 6	Cazenovia	J 5	Floral Park	A 2	Jordan	H 4
Afton	J 6	Cedarhurst	B 3	Florida	B 1	Katonah	D 1
Akron	C 4	Celoron	B 3	Fonda	M 5	Keeseville	O 2
Albany (cap.)	N 5	Centerach	E 2	Fort Ann	N 4	Kenmore	C 5
Albion	D 4	Center Moriches	F 2	Fort Covington	M 1	Kerhonkson	M 7
Alden	C 5	Central Islip	E 2	Fort Edward	O 4	Kinderhook	N 6
Alexandria Bay	J 2	Champlain	N 1	Fort Plain	L 4	Kings Park	E 2
Alfred	E 6	Chateaugay	N 1	Frankfort	K 4	Kings Point	A 2
Allegany	C 6	Chatham	N 6	Franklinville	D 6	Kingston	M 7
Altamont	M 5	Chautauqua	A 6	Fredonia	B 6	Lackawanna	B 5
Amenia	N 7	Chazy	N 1	Freeport	B 3	Lake Carmel	D 1
Amherst	C 4	Cheektowaga	C 5	Frewsburg	D 6	Lake Erie Beach	B 5
Amsterdam	E 3	Chenango Bridge	J 6	Fulton	H 4	Lake George	N 4
Angola	C 5	Chester	B 1	Gansevoort	N 4	Lake Katrine	M 7
Apalachin	H 6	Chittenango	J 4	Garden City	B 2	Lake Placid	N 2
Arcade	D 5	Churchville	E 4	Geneseo	E 5	Lake Pleasant	M 4
Ardley	H 1	Cincinnati	H 5	Geneva	G 5	Lake Success	A 2
Arlington	N 6	Clarence	C 5	Glasco	M 6	Lake View	B 5
Athens	D 3	Clarkson	E 4	Glen Cove	B 2	Lakewood	B 6
Attica	D 5	Clayton	H 2	Glen Head	B 2	Lancaster	C 5
Auburn	G 5	Clifton Park	N 5	Glen Falls	N 4	Larchmont	J 1
Aurora	G 5	Clifton Springs	F 5	Gloversville	M 4	Lawrence	A 3
Au Sable Forks	N 2	Clinton	K 4	Golden's Bridge	D 1	Le Roy	E 5
Averil Park	O 5	Clyde	G 4	Goshen	B 1	Levittown	B 2
Avoca	B 5	Cobleskill	L 5	Gouverneur	K 2	Lewiston	B 4
Avon	E 5	Cohoes	N 5	Gowanda	B 6	Liberty	L 7
Babylon	N 7	Colden	C 5	Grand Gorge	L 6	Lima	E 5
Bainbridge	J 6	Cold Spring	C 1	Grand Island	B 5	Lindenhurst	E 2
Baldwin	B 3	Colonie	N 5	Granville	O 4	Little Falls	L 4
Baldwinsville	H 4	Cornes	E 5	Great Neck	A 2	Little Valley	C 6
Balston Spa	N 5	Cooperstown	O 4	Greece	E 4	Liverpool	H 4
Balmville	M 7	Corinth	N 4	Greene	J 6	Livingston Manor	L 7
Batavia	D 5	Corning	F 6	Green Island	N 5	Lyonsia	E 5
Bath	F 6	Cornwall	C 1	Greenport	F 1	Lockport	C 4
Bayport	E 2	Cortland	H 5	Greenwich	O 4	Long Beach	B 3
Bay Shore	E 2	Coxsackie	N 6	Greenwood Lake	B 1	Lowville	J 3
Bayville	B 1	Croton Falls	D 1	Groton	H 5	Lynbrook	A 2
Beacon	N 7	Croton-on-Hudson	C 3	Hagaman	M 5	Lyon Mountain	N 1
Bedford Hills	D 1	Crown Point	N 3	Hamberg	C 5	Lyons	G 4
Bellevue	A 2	Cuba	D 6	Hamilton	J 5	Macedon	F 4
Belmore	B 2	Danmemora	N 1	Hammondsport	F 6	Malone	O 1
Belport	F 2	Dansville	E 5	Hampton Bays	F 2	Malverne	A 2
Belmont	E 6	Deer Park	D 2	Hancock	K 7	Mamaroneck	J 1
Bergen	E 4	Delhi	L 6	Harrison	C 1	Manchester	F 5
Big Flats	G 6	Delmar	N 5	Harrison	C 1	Manhasset	B 2
Binghamton	J 6	Depew	C 5	Hastings on Hudson	H 1	Manlius	J 5
Black River	J 3	Deposit	K 6	Haverstraw	C 1	Marathon	J 6
Blasdell	C 5	De Ruyter	J 5	Hawthorne	H 1	Marcellus	H 5
Bolivar	D 6	De Witt	H 4	Hempstead	A 2	Marcy	K 4
Bolton Landing	N 3	Dexter	H 2	Herkimer	L 4	Marlboro	M 7
Boonville	K 4	Dobbs Ferry	H 1	Heron	K 2	Massapequa	D 2
Brant Lake	N 3	Dolgeville	L 4	Herrings	J 2	Massapequa Park	D 2
Brentwood	E 2	Dryden	H 6	Heuvelton	K 1	Massena	L 1
Brewerton	H 4	Dundee	F 5	Hewlett	A 3	Mastic Beach	F 2
Brewster	D 1	Dunkirk	B 5	Hicksville	B 2	Mattituck	F 2
Broadalbin	M 4	Earlville	M 7	Highland	C 1	Maybrook	B 1
Brookport	D 4	East Aurora	C 5	Highland Falls	C 1	Mayfield	M 4
Brocton	B 6	East Greenbush	N 5	Hillburn	C 2	Mayville	A 6
Bronx	D 2	East Hampton	G 2	Hilton	E 4	McGraw	H 5
Bronxville	J 1	East Meadow	B 2	Holley	D 4	Mechanicville	N 5
Brooklyn	C 2	East Moriches	F 2	Homer	H 5	Medina	D 4
Brownville	H 3	East Northport	E 2	Honeoye Falls	F 5	Melrose Park	H 5
Buchanan	D 1	Eastport	F 2	Hoosick Falls	O 5	Menands	N 5
Buffalo	B 5	East Rochester	F 4	Hopewell Junction	N 7	Merrick	B 2
Caledonia	E 5	East Rockaway	B 3	Horseheads	G 6	Mexico	H 4
Cambridge	O 4	East Syracuse	H 4	Houghton	D 6	Middleburg	M 5
Camden	J 4	Eden	C 5	Hudson	N 6	Middle Hope	M 7
Camillus	H 4	Eggersville	C 5	Hudson Falls	O 4	Middleport	C 4
Canajoharie	L 5	Elbridge	G 5	Huntington	D 2	Middletown	B 1
Canandaigua	F 5	Elizabethtown	N 2	Huntington Station	E 2	Millbrook	N 7
Canastota	J 4	Elmira	M 7	Hurley	M 7	Millerton	O 7
Canisteo	E 6	Elmira Heights	G 6	Hyde Park	M 7	Mill Neck	B 2
Canton	K 1	Elmont	B 2	Ilion	K 5	Milton	M 7
Carmel	D 1	Elmsford	J 1	Inwood	A 3	Milton	N 4
Carthage	J 3	Endicott	H 6	Irondequoit	E 4	Mineola	B 2
Cassadaga	B 6	Endwell	H 6	Irvington	H 1	Mineville	O 2
Castleton-on-Hudson	N 5	Fairport	F 4	Island Park	B 3	Mohawk	L 4
Catskill	N 6	Fairview	N 7	Islip	E 2	Monroe	C 1
		Falconer	B 6	Ithaca	G 6	Montgomery	B 1
		Farmingdale	D 2	Jamaica	O 2	Monticello	L 7
		Fayetteville	J 4	Jamestown	B 6	Montour Falls	G 6
		Ferryville	N 4	Jericho	B 2	Moravia	H 5
				Johnson City	J 6	Morrisonville	N 1

© County seat.

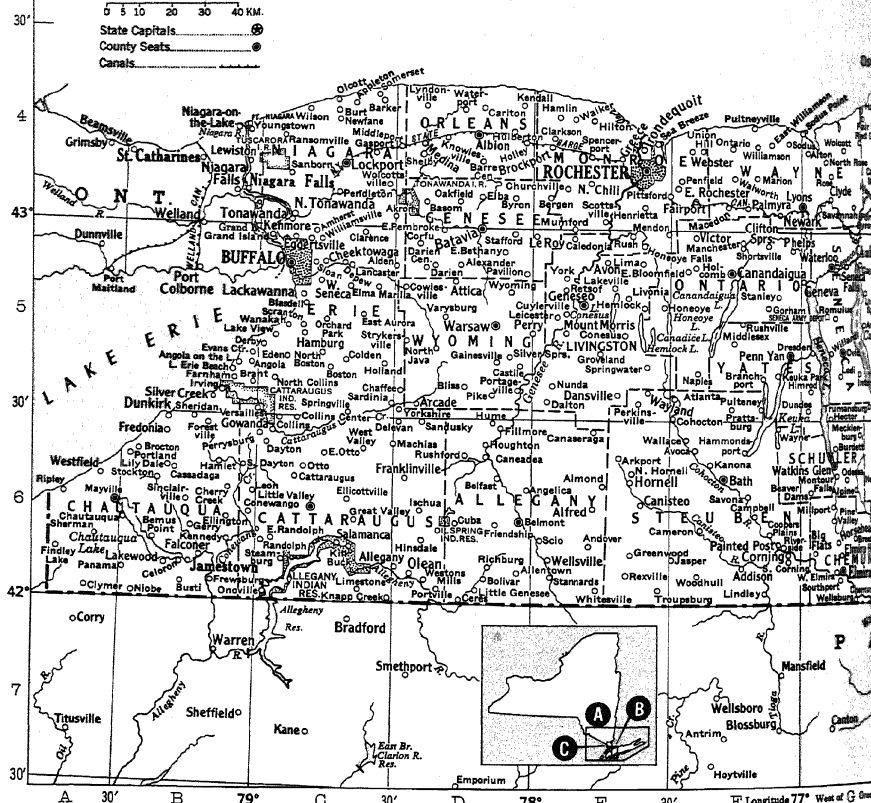
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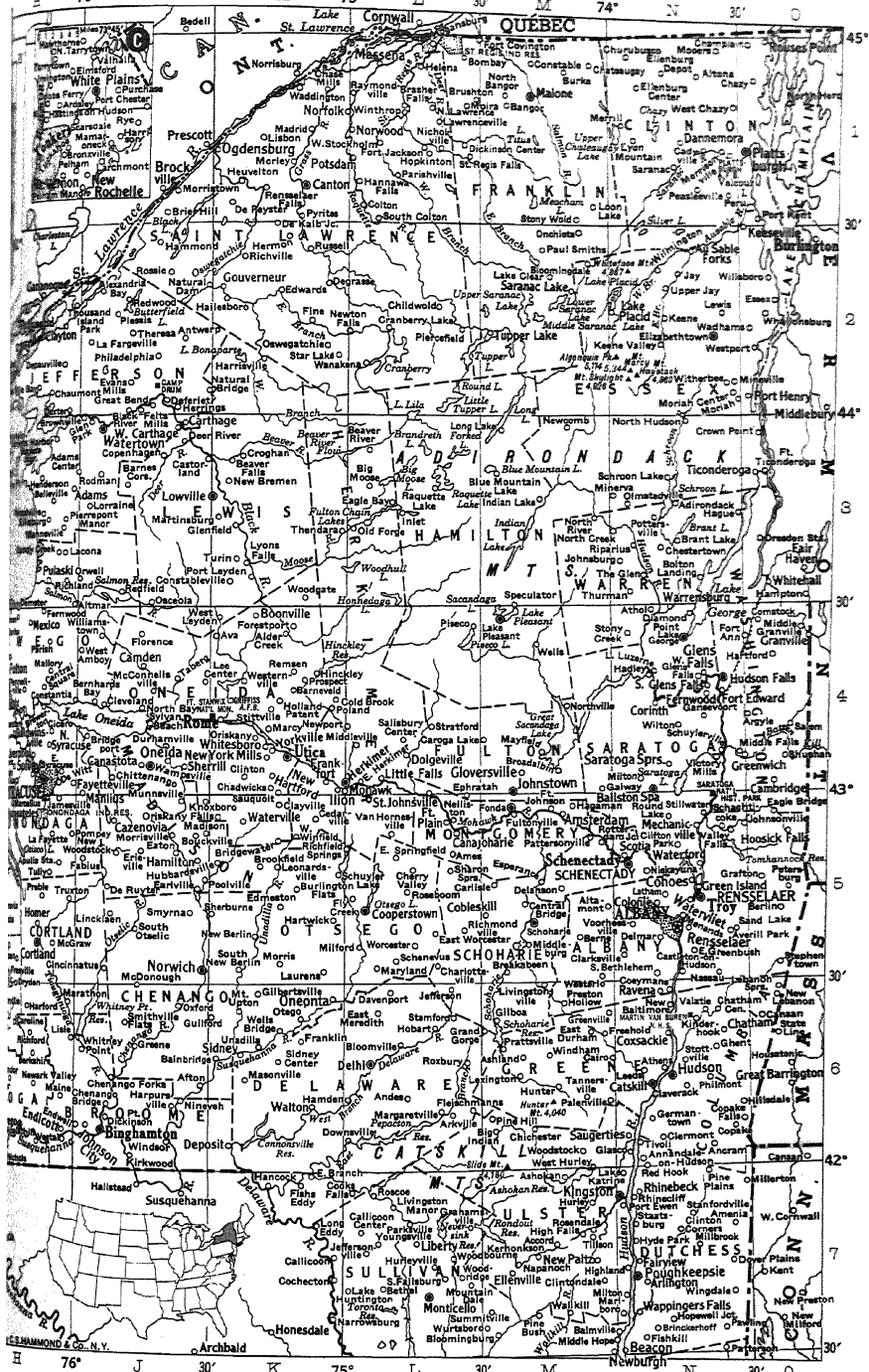
NEW YORK



NEW YORK

LAKE ERIE ONTARIO





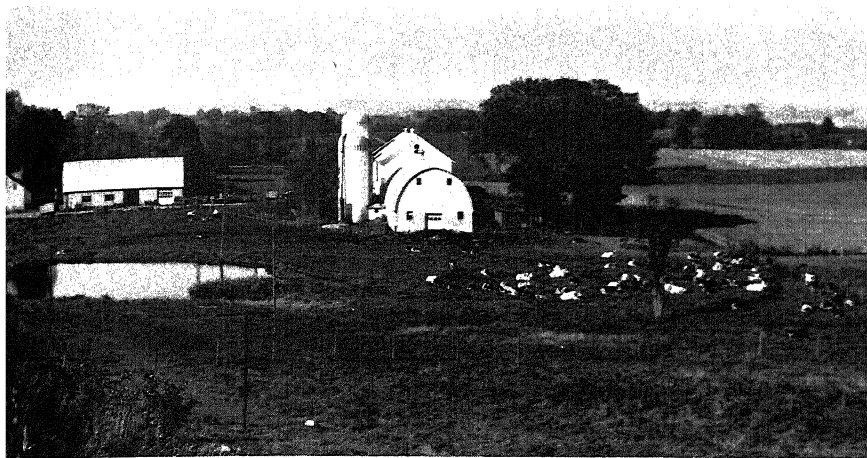
NEW YORK

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Morrisville	J 5	Rhinebeck	N 7	Wampsville ○	J 4	George (lake)	N 4
Mount Kisco	D 1	Richfield Springs	K 5	Wanakah	C 5	Grass (river)	K 1
Mount Morris	E 5	Ripley	A 6	Wantage	D 2	Great Sacandaga (lake)	M 4
Mount Vernon	H 1	Riverhead ○	F 2	Wappingers Falls	N 7	Great South (bay)	E 2
Nassau	F 5	Riverside	F 6	Warrensburg	D 5	Greenwood (lake)	B 2
Newark	G 4	Rochester ○	E 4	Warsaw	D 5	Griffiss A.F.B.	K 4
Newark Valley	H 6	Rockville Centre	B 2	Warwick	B 1	Honeoye (lake)	F 5
New Berlin	K 5	Rome	J 4	Waterford	N 5	Hudson (river)	N 7
Newburgh	C 1	Ronkonkoma	E 2	Waterloo ○	G 5	Hunter (mt.)	M 6
New City ○	C 2	Rosebush	B 2	Watertown ○	J 3	Indian (lake)	M 3
Newfane	C 4	Roscoe	L 7	Watervliet	N 5	Jones (beach)	B 3
New Hartford	K 4	Roslyn	B 2	Watkins Glen ○	G 6	Keuka (lake)	F 5
New Hyde Park	A 2	Rouses Point	O 1	Waverly	G 7	Long (isl.)	E 2
New Paltz	M 7	Rye	J 1	Wayland	E 5	Long (lake)	M 2
New Rochelle	J 1	Sacketts Harbor	G 2	Webster	F 4	Long Island (sound)	E 2
New Windsor	C 1	Sag Harbor	H 3	Weedsport	G 4	Manhattan (isl.)	C 2
New York ○	C 2	Saint George ○	C 3	Wellsville	E 6	Marcy (mt.)	N 2
New York Mills	K 4	Saint Johnsville	L 5	Westbury	B 2	Martin Van Buren Nat'l Hist. Site	M 6
Niagara Falls	C 4	Salamanca	C 6	West Carthage	J 3	Mohawk (river)	L 5
Niskayuna	N 5	Salem	O 4	West Elmira	G 6	Montauk (point)	H 2
Norfolk	K 1	Sands Point	D 2	Westfield	A 6	Moore (river)	K 3
North Boston	C 5	Saranac Lake	M 2	West Glens Falls	N 4	Neversink (res.)	L 7
North Chili	E 4	Saratoga Springs	N 4	Westhampton	F 2	New York State Barge (canal)	C 4
North Collins	C 5	Saugerties	M 6	Westhampton Beach	F 2	Niagara (river)	B 4
Northport	E 2	Sauquoit	K 5	West Point	C 1	Oil Spring Ind. Res.	D 6
North Syracuse	H 4	Sayville	E 2	West Seneca	C 5	Onedaga (lake)	J 4
North Tarrytown	H 1	Scarsdale	J 1	Whitehall	O 3	Onondaga Ind. Res.	H 5
North Tonawanda	C 4	Schenectady ○	M 5	White Plains ○	J 1	Orient (point)	G 2
Northville	M 4	Schoharie ○	M 5	Whitesboro	K 4	Oswegatchie (river)	K 2
Norwich ○	J 5	Schuylerville	N 4	Williamson	F 4	Oswego (river)	H 4
Norwood	L 1	Scotia	N 5	Williamsport	C 5	Otisco (lake)	H 5
Nunda	E 5	Scottsville	E 4	Williston Park	B 2	Otsego (lake)	L 5
Nyack	C 2	Scriba	H 4	Wilson	G 4	Owasco (lake)	G 5
Oakfield	D 4	Sea Cliff	B 2	Wolcott	C 4	Peconic (bay)	F 2
Oceanside	B 3	Seneca Falls	G 5	Woodmere	B 3	Pepacton (res.)	L 6
Ogdensburg	K 1	Sherburne	K 5	Woodstock	M 6	Placid (lake)	N 2
Oilcott	C 4	Sherrill	J 4	Yonkers	H 1	Plattsburgh A.F.B.	N 1
Onean	D 6	Sidney	K 6	Yorktown	C 1	Poosepatuck Ind. Res.	F 2
Oneonta	K 6	Silver Creek	B 5	Yorkville	K 4	Raquette (lake)	L 3
Orchard Park	C 5	Skaneateles	H 5	Youngstown	C 4	Raquette (river)	L 1
Oriskany	K 4	Sloan	C 5			Rondout (res.)	M 7
Ossining	D 1	Sloatsburg	C 2			Sagamore Hill Nat'l Hist. Site	B 2
Oswego ○	G 4	Smithtown	E 2			Saint Lawrence (lake)	K 1
Ovid ○	H 6	Sodus	G 4			Saint Lawrence (river)	J 2
Owego ○	H 6	Sodus Point	G 4			Saint Regis (river)	L 1
Oxford	J 6	Solvay	H 4			Saint Regis Ind. Res.	M 1
Oyster Bay	B 2	Southampton	G 2			Salmon (river)	H 3
Painted Post	F 6	South Corning	F 6			Salmon (river)	M 1
Palmyra	F 4	South Fallsburg	L 7			Saranac (lakes)	M 2
Patchogue	E 2	South Glens Falls	N 4			Saranac (river)	N 1
Pawling	N 7	Southold	F 2			Saratoga (lake)	N 4
Pearl River	C 2	Southport	G 6			Saratoga Nat'l Hist. Park N 4	
Peekskill	D 1	Spencerport	E 4			Schoharie (creek)	M 6
Pelham	H 1	Spring Valley	C 2			Schroon (lake)	N 3
Pelham Manor	H 1	Springville	C 5			Seneca (lake)	G 5
Perfield	F 4	Stamford	L 6			Seneca (river)	G 5
Penn Yan ○	F 5	Stillwater	N 5			Shelter (isl.)	G 1
Perry	D 5	Stony Brook	E 2			Shinnecock Ind. Res.	G 2
Peru	N 1	Stony Point	C 1			Skaneateles (lake)	H 5
Phelps	F 5	Stottville	N 6			Slide (mt.)	L 6
Philmont	N 6	Suffern	C 2			Staten (isl.)	C 3
Phoenix	H 4	Syosset	B 2			Susquehanna (river)	H 6
Piermont	C 2	Syracuse ○	H 4			Thousand (isls.)	H 2
Pine Bush	B 1	Tarrytown	H 1			Tioughnioga (river)	H 6
Pittsford	E 4	Thomaston	B 2			Tonawanda Ind. Res.	D 4
Plainville	D 2	Ticonderoga	N 3			Tupper (lake)	M 2
Plattsburgh ○	O 1	Tilson	M 7			Tuscarora Ind. Res.	B 4
Pleasantville	D 2	Tonawanda	B 4			Unadilla (river)	K 5
Port Byron	G 4	Troy ○	N 5			Upper Saranac (lake)	M 2
Port Chester	J 1	Trumansburg	G 5			Valcour (isl.)	N 1
Port Ewen	N 7	Tuckahoe	H 1			Whiteface (mt.)	N 2
Port Henry	C 2	Tupper Lake	M 2				
Port Jefferson	E 2	Unadilla	K 6				
Port Jervis	A 1	Union Springs	G 5				
Portville	D 6	Utica ○	K 4				
Port Washington	A 2	Valatie	N 6				
Potsdam	K 1	Valhalla	J 1				
Poughkeepsie ○	N 7	Valley Stream	A 2				
Pulaski	H 3	Vestal	H 6				
Purchase	J 1	Victor	F 5				
Queens Village	A 2	Voorheesville	M 5				
Randolph	C 6	Walden	B 1				
Ravena	N 6	Wallkill	M 7				
Red Hook	N 7	Walton	K 6				
Rensselaer	N 5						

Physical Features

Adirondack (mts.)	M 3	Raquette (lake)	L 3
Algonquin (peak)	M 2	Raquette (river)	L 1
Allegany Ind. Res.	C 6	Rondout (res.)	M 7
Allegheny (res.)	C 6	Sagamore Hill Nat'l Hist. Site	B 2
Allegheny (river)	C 6	Saint Lawrence (lake)	K 1
Ashokan (res.)	M 7	Saint Lawrence (river)	J 2
Ausable (river)	N 2	Saint Regis (river)	L 1
Batten Kill (river)	O 4	Saint Regis Ind. Res.	M 1
Beaver (river)	K 3	Salmon (river)	H 3
Black (river)	K 3	Salmon (river)	M 1
Blue Mountain (lake)	M 3	Saranac (lakes)	M 2
Brookhaven		Saranac (river)	N 1
National Lab	E 2	Saratoga (lake)	N 4
Camp Drum	J 3	Saratoga Nat'l Hist. Park N 4	
Canandaigua (lake)	F 5	Schoharie (creek)	M 6
Canisteo (river)	F 6	Schroon (lake)	N 3
Cannonsville (res.)	K 6	Seneca (lake)	G 5
Catskill (mts.)	L 6	Seneca (river)	G 5
Cattaraugus Ind. Res.	C 5	Shelter (isl.)	G 1
Cayuga (lake)	G 5	Shinnecock Ind. Res.	G 2
Champlain (lake)	O 1	Skaneateles (lake)	H 5
Chautauqua (lake)	A 6	Slide (mt.)	L 6
Chazy (lake)	N 1	Staten (isl.)	C 3
Chenango (river)	J 6	Susquehanna (river)	H 6
Cochocton (river)	F 6	Thousand (isls.)	H 2
Conesus (lake)	E 5	Tioughnioga (river)	H 6
Cranberry (lake)	L 2	Tonawanda Ind. Res.	D 4
Delaware (river)	K 7	Tupper (lake)	M 2
East (river)	C 2	Tuscarora Ind. Res.	B 4
Errie (lake)	B 5	Unadilla (river)	K 5
Fire Isl. Nat'l Seashore	F 2	Upper Saranac (lake)	M 2
Fishers (isl.)	G 1	Valcour (isl.)	N 1
Fort Niagara	C 4	Whiteface (mt.)	N 2
Fulton Chain (lakes)	K 3		
Gardiners (isl.)	G 2		
Gateway Nat'l Rec. Area C 3			
Genesee (river)	E 5		



Oneida and George (qq.v.); and the three Saranac lakes. The lakes and ponds of the State number about 8000. Among artificial lakes are Great Sacandaga Lake on the Sacandaga R.; New Croton and Croton Falls reservoirs on the Croton R. and Ashokan Reservoir on Esopus Creek, which are part of the New York City water-supply system; and Downsville and Pepacton reservoirs on the East Branch of the Delaware R. and Cannonsville Reservoir on the West Branch of the Delaware.

Climate. Because of the varied topography of New York, the climate of the State varies widely. The plateau region in the w. has an almost typical continental climate, with relatively hot days and cool nights in summer and severe winters. Long Island and the lower Hudson valley, influenced by the ocean, have mild winters and relatively cool summers, with infrequent sudden changes of temperature. The highest temperature recorded in the State was 108° F. (at Troy); the lowest, -52° F. (at Stillwater Reservoir). Precipitation varies also, averaging 50 in. in the plateau and mountain areas and 30 in. in the valley and lake regions. Snowfall ranges from 20 to 30 in. on Long Island, to 40 to 60 in. in the Finger Lakes area, and more than 100 in. in the Adirondack and Catskill mountains. In the snow belts at the E. ends of Lakes Erie and Ontario, the average fall ranges from 100 to 188 in., the greatest of record E. of the Rocky Mts. The average annual number of days with measurable precipitation ranges from 121 in New York City and 131 at Albany to 166 at Buffalo and 168 at Syracuse. Tornadoes occur infrequently, and tropical storms occasionally strike Long Island and the S.E. part of the State.

Pleasant Valley in Dutchess County, north of New York City, is typical dairy country.

New York State Department of Commerce

Climate	Albany	Buffalo	New York
Normal temperatures (in °F.)			
January maximum	30.4	99.8	38.5
January minimum	12.5	17.6	25.9
July maximum	83.9	79.5	85.2
July minimum	60.1	60.7	68.0
Annual	47.6	47.1	54.5
Normal precipitation (in inches)			
Wettest month	3.25	3.72	4.01
Driest month	2.11	2.23	2.71
Annual	33.36	36.11	40.19
Latest frost	April 27	April 30	April 7
Earliest frost	Oct. 13	Oct. 25	Nov. 12
Mean number of days between latest and earliest frosts	169	179	219

Plants and Animals. New York has introduced many species of plants from Southern areas, which thrive exceptionally well in the s. portions of the State. In the Catskill and Adirondack areas along the Hudson R., acid-loving plants predominate, especially azalea, rhododendron, blueberry, mountain laurel, and evergreen trees. Other native trees found throughout the State include oak, birch, maple, sassafras, spruce, pine, hemlock, and cedar. Among wild flowers, trillium, gentian, geranium, dogtooth violet, and several species of orchids are worthy of note. The most important big-game species in New York State is the white-tailed deer. Black bears still inhabit wild parts of the State. Among the more conspicuous and common mammals are the woodchuck, gray squirrels, striped skunk, raccoon, and the southern opossum. Several dozen smaller and less conspicuous mammals are native to the State, including bats, mice, and insectivores such as the shrew and mole.

NEW YORK

Parks, Forests, and Other Places of Interest.

New York has many national memorials of historic events. Saratoga National Historic Park is the scene of an American victory over the British in 1777, the turning point in the Revolution and one of the decisive battles of world history. Castle Clinton National Monument (q.v.) is in Battery Park, New York City. Federal Hall National Memorial (q.v.), in New York City, was the first seat of the Federal government. General Grant National Memorial, in New York City, contains the tombs of President Ulysses S. Grant (q.v.), and his wife. The Home of Franklin D. Roosevelt National Historic Site, at Hyde Park, is the birthplace and burial place of the 32nd President. Sagamore Hill, in Oyster Bay, L.I., was the home of President Theodore Roosevelt (q.v.) from 1885 until his death; and Theodore Roosevelt Birthplace National Historic Site (q.v.), in New York City, was his childhood home. Statue of Liberty National Monument, on Liberty Island in New York Harbor, has the statue "Liberty Enlightening the World" by Frédéric Auguste Bartholdi (q.v.), a gift (1884) of the French people. Hamilton National Memorial, to be relocated on the campus of the City University of New York, is a home of Alexander Hamilton (q.v.). The 26,172-acre Gateway National Recreation Area, partly in New Jersey, was authorized in 1972. Historic sites maintained by the State include the Bennington Battlefield, near Walloomsac; Fort Crailo, near Rensselaer; the John Brown Farm, at North Elba; Oriskany Battlefield, near Utica; the Steuben Memorial, near Remsen; and Washington's Headquarters, in Newburgh. Extensive areas of New York, both in the interior and in the coastal regions, have been reserved for recreational or conservation purposes. Fire Island National Seashore is a barrier island off Long Island, with dunes, marshes, and beaches. The State maintains more than 335 forests and more than 110 parks. The major component of the park system is the Adirondack Forest Preserve, comprising more than 2,200,000 acres. Other notable units include the Catskill Forest Preserve, in the Catskill Mts.; Allegany State Park, in the s.w.; Palisades Interstate Park (partly in New Jersey), along the w. bank of the Hudson R.; Jones Beach State Park, on the Atlantic coast of Long Island; Niagara Reservation, at Niagara Falls; and Watkins Glen State Park, containing a 2-mi. gorge with spectacular rock formations.

Sports. The many waters of New York provide excellent fishing. Among freshwater species are black bass, chain pickerel, walleye and northern pike, Great Lakes whitefish, muskellunge, landlocked salmon, bullhead, and four varieties of

trout. Saltwater fishermen find white and blue marlin, giant and school tuna, kingfish, bluefish, striped bass, broadbill swordfish, flounder, blackfish, snapper blue, and whiting. Game animals and birds hunted include white-tailed deer, black bear, snowshoe hare, cottontail rabbit, gray squirrel, ring-necked pheasant, ruffed grouse, wild turkey, bobwhite quail, and Hungarian partridge. The State has about sixty ski resorts, among the largest being Whiteface Mt. Ski Center, at Wilmington; Snow Ridge, at Turin; and Hunter Mt. Ski Bowl, at Hunter. For mountain climbers, the Adirondack Mts. have two peaks over 5000 ft. and many over 4000 ft. Mount Marcy has five well-marked trails and offers some rock climbing. The Kittatinny and Shawangunk Mts. also offer good rock climbing.

THE PEOPLE

According to the 1970 decennial census, the population of New York was 18,241,266, an increase of 8.4 percent over the 1960 population. The urban segment comprised 15,557,486 persons, 85.5 percent of the total, compared with 85.4 percent in 1960. The rural segment comprised 2,633,254 persons, 14.5 percent of the total, compared with 14.6 percent in 1960. Ethnically, the 1970 population was distributed as follows: white persons, 15,834,090; nonwhites, 2,402,877, including 2,168,949 Negroes, 81,378 Chinese, 28,355 Indians, 20,351 Japanese, 14,279 Filipinos, and others. The percentage of native-born residents in 1970 was 88.4; of foreign-born, 11.6. The major countries of origin of the foreign-born, in order of rank, were Italy, Poland, the Soviet Union, Great Britain, Ireland, and Canada. The 1970 population density averaged 381.3 per sq.mi., compared with 350.6 in 1960.

The chief cities are Albany, the capital and sixth-largest city, an industrial center; and, in order of population, New York, national leader in commerce, finance, publishing, and manufacturing, and a world center of culture and education; Buffalo, a port on Lake Erie, the center of a vast industrial region; Rochester, a center for manufacturing, particularly of photographic and optical equipment; Yonkers, a residential suburb of New York as well as a manufacturing center; and Syracuse, an industrial center.

Education. The public-school system of New York was established in 1784. Education is free and compulsory for all children between the ages of seven and sixteen.

ELEMENTARY AND SECONDARY SCHOOLS. In the early 1970's public elementary schools numbered about 3150 and public secondary schools numbered 1100. Enrollment was about 2,450,000 in elementary and about 1,050,000 in secondary

schools. Classroom teachers in the public-school system numbered about 187,500 in elementary and secondary schools. In the early 1970's private elementary and secondary schools numbered about 2200, with some 840,000 students. Teachers in private schools numbered about 33,880.

UNIVERSITIES AND COLLEGES. In the early 1970's New York had 219 institutions of higher learning, 145 of which were private. University and college enrollment was about 777,000. Public institutions include The City University of New York, the State University of New York, United States Merchant Marine Academy, United States Military Academy (qq.v.), and Auburn, Corning, Mohawk Valley, Monroe, Niagara County, Onondaga, Orange County, Suffolk, Westchester, and other community colleges. Private institutions include the American Academy of Dramatic Arts, Bard College, Colgate University, Columbia University, The Cooper Union for the Advancement of Science and Art, Cornell University, Fordham University, Hamilton College, Hebrew Union College-Jewish Institute of Religion, Hobart and William Smith Colleges, The Jewish Theological Seminary of America, The Juilliard School, New York University, the University of Rochester, Saint John's University, Sarah Lawrence College, Syracuse University, Union College and University, Union Theological Seminary, of New York City, Vassar College, and Yeshiva University (qq.v.). Other private institutions include Adelphi University, Alfred University, Bank Street College of Education, Bennett College, Briarcliff College, Brooklyn Law School, Clarkson College of Technology, Hofstra University, Houghton College, Iona College, Ithaca College, Long Island University, Manhattan College, Manhattan School of Music, Manhattanville College of the Sacred Heart, Marymount College, New School for Social Research, New York Institute of Technology, New York Law School, New York Medical College, Niagara University, Polytechnic Institute of New York, Pratt Institute, Rensselaer Polytechnic Institute, Rochester Institute of Technology, The Rockefeller University, Saint Lawrence University, Skidmore College, Wagner College, Webb Institute of Naval Architecture, and Wells College.

Libraries and Museums. New York has one of the six largest libraries in the world, the New York (City) Public Library, housing some 3,150,000 volumes, 5,000,000 works in the reference department, 25,000 titles in the periodicals department, and 9,000,000 items in the manuscript divisions. Other notable libraries are the Brooklyn (Borough) Public Library, with about 2,600,

000 volumes, and the Queens Borough Public Library, with 2,100,000 volumes, both in New York City; the Buffalo and Erie County Public Library, with more than 2,100,000 volumes; and the Rochester Public Library, with 750,000 volumes. The New York State Library in Albany, the largest State library in the U.S., has 3,000,000 works, mainly devoted to New York and American history. Special libraries, all in New York City, include the American Museum of Natural History Library, with about 200,000 volumes; the New York Historical Society Library, with 500,000; and the United Nations Library, which includes the Dag Hammarskjöld and Woodrow Wilson Memorial libraries. Of special interest is the Franklin D. Roosevelt Library, in Hyde Park.

Of the innumerable cultural facilities in New York City, outstanding museums include the Metropolitan Museum of Art, the Museum of Modern Art, the Whitney Museum of American Art, the Solomon R. Guggenheim Museum, the Frick Collection, the American Museum of Natural History and Hayden Planetarium, the Jewish Museum, the Hispanic Society of America, and the Museum of the American Indian. The Brooklyn Institute of Arts and Sciences comprises four institutions devoted to the arts. In Buffalo are the Albright-Knox Art Gallery, of the Fine Arts Academy, and the Museum of Science.

THE ECONOMY

New York is an industrial State. Per capita personal income in 1976 was \$7100, compared with \$6441 for the U.S. as a whole. The percentage of workers engaged in agriculture is negligible, but employment numbers over 100,000. Nonagricultural workers are employed, in descending order of numbers, in service industries; manufacturing; wholesale and retail trade; government; finance, real estate, and insurance; transportation and public utilities; and construction. The State economy is complex and is an important factor in both the national economy of the U.S. and the international economy. New York accounts for about 25 percent of the imports and exports of the U.S. through its three customs districts. It is the leading State in banking and also has heavy concentrations of manufacturing, advertising, and insurance. More headquarters of large business corporations are located in the New York City metropolitan area than in the next seven U.S. cities combined.

Manufacturing. According to a recent survey of manufactures, production workers in New York total 909,500, the most of any State except Pennsylvania. The largest numbers are employed in the manufacture of apparel and other textile

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products, electrical and electronic equipment, nonelectrical machinery, and in printing and publishing. The manufacture of medical and industrial instruments is economically important, although it employs relatively few workers. The major manufacturing center is the Standard Metropolitan Statistical Area (q.v.) that includes New York City and parts of New Jersey. The city of New York itself has about 40 percent of the production workers in the State; other important manufacturing regions are the Buffalo, Nassau-Suffolk, Rochester, Syracuse, and Albany S.M.S.A.'s. In the mid-1970's the annual value added by manufacture (see VALUE) in the largest industries was about \$4.85 billion for printing and publishing, \$4.63 billion for instruments and related products, \$3.53 billion for nonelectrical machinery, and \$3.47 billion for electrical and electronic equipment. New York was second only to California in total value added by manufacture, with about \$35.04 billion per year.

Agriculture. New York ranks twenty-second in the nation in cash receipts from agriculture. The State's principal agricultural commodities are milk, cattle, eggs, and greenhouse products. New York is the third-ranking State in the U.S. in dairy products, and first in the production of apples and maple syrup. It is an important State in the production of grapes, both for juices and for wine. About 114,000 persons work on some 58,000 farms covering 11,400,000 acres; the average size of a farm is about 197 acres. In the mid-1970's total cash receipts from farming were about \$1.7 billion per year, including \$1.2 billion from livestock and \$474,757,000 from crops.

Fishing. New York, one of the Middle Atlantic States, had a catch of about 34,791,000 lb. per year in the mid-1970's, with a value of \$25,468,000. Clams, oysters, and scallops are the most important species taken. About 12,166 commercial fishermen were employed in the mid-1970's.

Mining. The principal mineral products of New York are cement, stone, zinc, and salt. The State leads the U.S. in production of emery and titanium concentrate and is second in production of abrasive garnet and of talc. The annual value of all mineral production was about \$398,000,000 per year in the mid-1970's, giving the State a rank of twenty-eight in the U.S.

Energy. Generating plants in New York, with a capacity of 31,000,000 kw, produced about 111.4 billion kw hours of electrical energy annually in the mid-1970's. About 29 percent of production and 21 percent of capacity were publicly owned. Among the sources of power were seven utility-operated nuclear reactors and two major hydroelectric plants.

Forestry. The forest land of New York consists predominantly of hardwoods. The forest land, primarily under private ownership, comprises about 14,500,000 acres. It produces a net annual cut of sawtimber of some 416,000,000 bd.ft.

Tourism. In the mid-1970's tourism and business travel contributed about \$4.6 billion annually to the State's economy. Among the most popular attractions are New York City, the Long Island beaches, Niagara Falls, the Adirondack and Catskill mountains, the Finger Lakes, and lakes Ontario and Erie.

Transportation. The first railroad in New York was the Mohawk and Hudson, inaugurated on Aug. 9, 1831. Today the State is served by several major railroads with about 5215 mi. of track. Rural and municipal roads total some 108,600 mi.; Federally assisted primary and secondary highways total about 10,645 mi., including about 1334 mi. in the Interstate Highway System. The State is served by about 49 international airlines and 21 local and interstate airlines. There are some 67 public and 421 private airports. The Port of New York is the busiest in the U.S.; other large ports are Hempstead and Port Jefferson on Long Island, Albany, and Buffalo. The Hudson R. is the major commercial waterway; it is connected with the Saint Lawrence Seaway (q.v.) by the Champlain Canal and Lake Champlain. The New York State Barge Canal System (q.v.) extends from the Niagara R. at Tonawanda to Champlain Inlet at Whitehall and includes the Erie, Oswego, Cayuga-Seneca, and Champlain canals and harbors at Utica, Syracuse, and Rochester. Black Rock Channel and Tonawanda Harbor, near Buffalo, are also important ports.

Communications. The first newspaper in New York was the *New York Gazette*, founded in 1725. The State now has some 78 daily newspapers and 25 Sunday papers. Among the leading papers are the *New York City Daily News*, *Post*, *Times*, and *Wall Street Journal*; the *Rochester Democrat & Chronicle* and *Times-Union*; the *Buffalo News* and *Courier-Express*; the *Syracuse Herald-Journal*; and *Newsday*, published in Garden City. Of 339 radio stations in operation, among the oldest are WGR in Buffalo; WHCU in Ithaca; WABC, WNBC, and WOR in New York City; and WGY in Schenectady, all established in 1922. There are about 40 television stations.

GOVERNMENT

New York is governed under the constitution of 1894, as amended. Executive authority is vested in a governor, a lieutenant governor, and an attorney general, all elected for four-year terms; a secretary of state chosen by the governor; and other appointed officials. Legislative authority is

exercised by the Senate with fifty-seven members and the Assembly with 150 members, all elected for two-year terms. The legislature meets annually. The judicial system includes a seven-member court of appeals (highest court), appellate divisions of the supreme court, a supreme court, and various lesser and special courts. The State is divided into sixty-two counties, including the five counties (boroughs) comprising New York City.

New York is represented in the United States Congress by two Senators and forty-one Representatives.

Voting Qualifications. Suffrage is extended generally to U.S. citizens eighteen years of age who meet New York State residence requirements (three months in the State and county, city, or village).

HISTORY

The first European of record to visit the coastal region of what is now New York was the Florentine navigator Giovanni da Verrazano (q.v.), who discovered present-day New York Bay in 1524. Nearly a century elapsed before serious exploration of the region was undertaken. In 1609 Henry Hudson (q.v.), an English navigator in the employ of the Dutch East India Company, piloted his vessel, the *Half Moon*, up the river that now bears his name, reaching the site of modern Albany. The French explorer Samuel de Champlain (q.v.), operating from Québec, ex-

plored the northern portion of the region in the same year. Champlain shortly came into conflict with a powerful Indian confederacy of the Iroquoian linguistic stock, known as the Five Nations (q.v.) and comprising the Onondaga, Cayuga, Oneida, Mohawk, and Seneca. These tribes occupied most of the region west of the upper Hudson R. A number of lesser tribes, mainly of the Algonquian stock, inhabited the coastal areas.

Dutch Settlement. After Hudson's expedition, Dutch merchants dispatched a trading vessel to the region, which had been named New Netherland. The vessel returned to the Netherlands with a profitable cargo of furs, with the result that additional voyages to New Netherland were organized. Trading posts were established on Manhattan Island and in the vicinity of present-day Albany about 1613. With the founding of the West India Company in 1621, the Dutch began to colonize New Netherland. The first permanent colonists arrived in May, 1624. More settlers arrived in 1625, and the next year Peter Minuit (q.v.), the first director general of the colony, purchased Manhattan Island from the Indians for goods valued at 60 guilders (about \$24). Under Minuit's direction, a fort, called Fort Amsterdam, was constructed at the southern

Niagara Falls, a spectacular scenic landmark, borders New York State and Canada.

New York State Department of Commerce



end of Manhattan. New Amsterdam, the settlement that grew up around the fort, became the administrative center of the colony. Because the West India Company, which had been granted a commercial monopoly in New Netherland by the Dutch government, was concerned chiefly with trade, colonization proceeded very slowly for more than a decade. To encourage settlement, the company issued, in 1629, a charter of privileges and exemptions, under which members of the company received the right to buy extensive tracts of land from the Indians. The grantees, who became known as patroons (q.v.), were required to establish no fewer than fifty settlers on each tract. Among those who acquired vast estates in New Netherland was Kiliaen Van Rensselaer (see under VAN RENSSELAER). Through successful violation of the company trade monopoly, he and other patroons shortly acquired the power and independence of feudal barons.

The West India Company relinquished its commercial monopoly in New Netherland in 1638. This move was followed by an influx of colonists, including English Puritans and French Huguenots. In 1641, as a result of the provocative attitude of the Dutch director general, Willem Kieft (1600?-47), the colony became embroiled in a disastrous war with the Algonquian Indians. Most of the settlements in the vicinity of New Amsterdam were destroyed during the conflict, which lasted until 1645. In the course of the war the colonists confronted Kieft with demands for a voice in the government. Kieft consented to the establishment of a representative council, but retained effective power in his own hands. The colonists finally forced his removal in 1647, and he was replaced by Peter Stuyvesant (q.v.). Although Stuyvesant's rule was tyrannous in many respects, New Netherland prospered under his administration, growing in population from 2000 to 10,000.

Meanwhile, the English government had taken vigorous exception to Dutch colonial claims in America. In 1650, by the terms of the treaty of Hartford, Stuyvesant agreed to delimitation of the New Netherland-Connecticut frontier, accepting a line generally identical with the boundary between present-day Connecticut and New York. Tense relations between the Dutch and English persisted, and in 1664 Charles II (q.v.), King of England, established Long Island and all the territory between the Connecticut R. and Delaware Bay as an English province under the proprietorship of his brother James, Duke of York, later James II (q.v.), King of England. An English expedition, led by the newly

appointed provincial governor Colonel Richard Nicolls (q.v.), was promptly dispatched to New Netherland. On Sept. 8, 1664, Stuyvesant, lacking sufficient men and armament, surrendered New Amsterdam to Nicolls. In honor of James, the colony and its administrative center were renamed New York and Fort Orange was renamed Fort Albany.

English Control. The transition of rule in the colony was accomplished with a minimum of friction. A measure of self-government was authorized in the various settlements, and the Dutch policy of religious tolerance was perpetuated. In August, 1673, the Dutch, then at war with England, captured New York City and reestablished their control of the colony. English rule was restored by the provisions of the Treaty of Westminster, concluded in February, 1674. The Dutch withdrew from the colony in the following November.

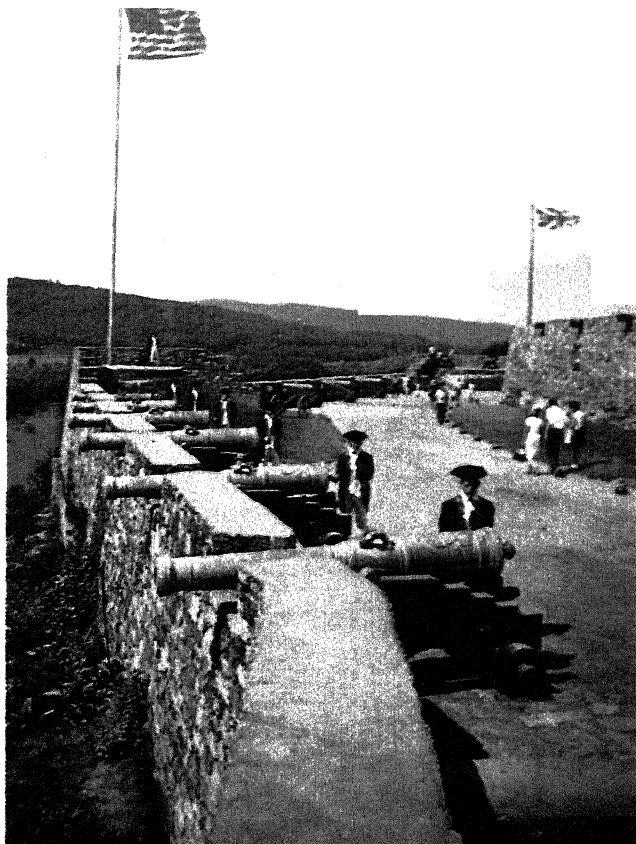
The period succeeding reinstitution of English control was marked by considerable internal unrest caused by the arbitrary acts of the new governor, Sir Edmund Andros (q.v.), by the consolidation of close relations with the Iroquois confederacy, and by recurrent border warfare in the north with the French. In this fighting the Iroquois tribes, hostile to the French since the time of Champlain, gave their support to the English, preventing then, as they did later, French subjugation of upper New York. In 1689, following the outbreak of revolution in England, a colonial Protestant party led by Jacob Leisler (1640?-91) seized power in New York City. The French, taking advantage of the consequent political confusion in the colony, attacked and burned Schenectady in February, 1690. In 1691 Leisler was deposed by Colonel Henry Sloughter, the newly appointed governor of the colony, and executed.

Despite continuing warfare with the French, the colony grew and prospered after the turn of the century; see FRENCH AND INDIAN WAR. The first newspaper, the *Gazette*, was founded in 1725. Eight years later an opposition paper, the *Weekly Journal*, appeared. In 1734, John Peter Zenger (q.v.), editor of the *Journal*, was charged with libel because of his criticism of the provincial governor, and was brought to trial. Supported by the people and the provincial assembly, Zenger won the case, helping to establish the principle of freedom of the press in the U.S.

The Revolution. New York figured in the events leading to the start of the American Revolution. As early as 1762, petitions and remonstrances against the oppressive commercial policy of the British government had been

New York State. Plate 1.
 Right: A scene at Fort Ticonderoga, a Revolutionary War landmark that has been restored and is maintained as a historic monument. On May 10, 1775, the American soldiers Ethan Allen and Benedict Arnold captured the fort from the British in a surprise attack.
 Below: Montauk Point, a promontory at the tip of the southern peninsula of Long Island, is equipped with a 168-ft. stone lighthouse to warn passing ships of the rugged coastline.

Pictures Plates 1 and 2.
 New York State Dept.
 of Commerce





New York State. Plate 2.
Left: Beds of tulips create a riot of springtime color in front of the State Capitol in Albany. Below: Aerial view of a few of the Thousand Islands, lying in an expansion of the Saint Lawrence River between New York and Ontario, Canada. The larger of the approximately 1700 islands are popular summer resorts.



submitted to Parliament and George III (q.v.), King of Great Britain. The Sons of Liberty, an organization of militant patriots, gave effective leadership to the struggle against the stamp tax (see STAMP ACT). After the refusal of the New York provincial assembly in 1766 to furnish supplies for British troops, and the passage by Parliament of the Townshend Acts (q.v.), relations between the anti-British and loyalist factions in the colony deteriorated rapidly. The Sons of Liberty and British troops fought a pitched battle in the streets of New York City in January, 1770. On the refusal, in January, 1775, of the provincial assembly, which had meanwhile come under the control of the loyalists, to send delegates to the second Continental Congress, New York patriots summoned a provincial congress. The congress met at New York City on April 20, 1775, and elected delegates to the Continental Congress. Following receipt of the news of the battle of Lexington, the provincial congress assumed control of the government and issued a call for a provincial convention. This body, which was in session from July 10, 1776, to April 20, 1777, drew up a constitution for the State of New York.

Although the Continental army was shortly forced to relinquish New York City and Westchester County to the British, it strenuously contested British operations in northern New York. The defeat at *Saratoga of the British army* under General John Burgoyne (q.v.) was one of the decisive engagements of the war; see SARATOGA, BATTLES OF.

In 1783, following the conclusion of hostilities, British forces evacuated New York City. The State had meanwhile (1778) ratified the Articles of Confederation. At the Constitutional Convention of 1787, however, the New York delegation, fearful of Federal interference with the commercial interests of the State, opposed the newly drafted Constitution of the United States (q.v.). A State convention, which convened at Poughkeepsie in June, 1788, finally voted (30 to 27) for ratification. The Federalist leader Alexander Hamilton (q.v.) played a decisive role at the convention.

The dominant figure in New York politics for more than two decades after Hamilton's death (1804) in a duel with Aaron Burr (q.v.) was De Witt Clinton (q.v.). An Anti-Federalist and governor of the State from 1817 to 1823 and again from 1825 to 1828, Clinton contributed substantially to the expansion of New York as a commercial and financial center. Largely as a result of his efforts, the Erie Canal (q.v.) project was initiated in 1817. The State constitution of 1777

was revised in 1821, with the new document representing a major advance toward more democratic government. Another constitutional revision in 1846 extended this trend.

The Civil War and Recent Times. Before the American Civil War, the mercantile interests of New York advocated peace at any price. A vast majority of the people were Unionist in sentiment, however, and despite serious disturbances in New York City in 1863 (see DRAFT RIOTS), the State was a decisive factor in the Union victory, providing more than 500,000 soldiers for the Federal armies.

After the Civil War, the economic development of New York continued at an uninterrupted pace. Agriculture expanded rapidly and the State also gained a huge lead in manufacturing and commerce. Until the mid-1950's the Port of New York, one of the finest harbors along the North Atlantic coast, handled more than half the nation's imports and about one third of its exports. A network of major roads, railways, rivers, and canals grew to link the port with upstate cities, as well as with those of other States and Canada.

From about 1865 to 1910 waves of European immigration dramatically increased New York's population and changed its ethnic composition. Today, with approximately 85 percent of the State's population concentrated in cities—nearly 50 percent in New York City alone—urban unrest is a significant problem. Protest over de facto segregation in predominantly nonwhite neighborhoods led to various outbreaks of violence in the 1960's. The costs of education, welfare, and health services have placed a heavy burden on State resources. At the same time major funding is needed to combat water pollution and expand transportation systems throughout the State.

NEW YORK BAY, inlet of the Atlantic Ocean, at the mouth of the Hudson R. Enclosed by the State of New Jersey and the New York City boroughs of Richmond (Staten Island), Manhattan, and Brooklyn, it consists of Upper New York Bay and Lower New York Bay, which are connected by a short strait called the Narrows (q.v.). The Gateway National Recreation Area, authorized in 1972, is at the bay's entrance.

NEW YORK CITY, chief city of New York State, largest city in population in the United States, and commercial and financial metropolis of the Western Hemisphere. It is located in the S.E. corner of the State, on the Hudson R., East R., and New York Bay. The area of the city is 320.34 sq.mi.

Originally consisting of Manhattan Island



The skyline of Manhattan, viewed from the R.C.A. building in midtown. New York City has many skyscrapers.

Photo Researchers

and, by an act of the New York State legislature, consolidated with adjacent communities on Jan. 1, 1898, New York comprises five boroughs, each of which is coextensive with a county. In the order of area, these boroughs are Queens, which is coextensive with Queens County, one of the four counties of Long Island (q.v.); Brooklyn, which is coextensive with Kings County, another of the counties of Long Island; Richmond (q.v.), which is coextensive with Richmond County and Staten Island; the Bronx, which is coextensive with Bronx County, the only county of the city on the New York State mainland; and Manhattan, which is coextensive with New York County and Manhattan Island. In the order of population (1970), the boroughs rank as follows: Brooklyn, Queens, Manhattan, the Bronx, and Richmond. Each of the boroughs is the subject of a separate article containing pertinent data on industry, cultural institutions, history, and other features.

Measured from the n. extremity of the Bronx to the s. extremity of Brooklyn, the length of New York City is 36 mi.; its maximum width, in an e. and w. direction, is 25 mi. The terrain of the city is generally level, but deeply eroded spurs of the Berkshire Hills extend into the Bronx and

Manhattan. In these boroughs the maximum elevations are respectively 284.5 ft. and 267.7 ft. The terrain of the other three boroughs falls within the province of the Atlantic coastal plain. A range of morainic hills extends in a general e. and w. direction through these boroughs. Maximum elevations in Queens, Brooklyn, and Richmond are respectively 266.4 ft., 182.7 ft., and 409.8 ft. Todt Hill, the last-named elevation, is one of the highest points on the Atlantic coast of the U.S.

A number of lesser islands, mainly in the East R., form part of New York City. The principal lesser islands in New York Bay (q.v.) are Governors Island, a United States Coast Guard base; Ellis Island (qq.v), the former immigration station; and Liberty Island, site of the celebrated Statue of Liberty.

One of the outstanding geological features of the site of New York is an underlying formation of mica, a metamorphic rock, known as Manhattan schist. This formation, which occurs in several of the boroughs, notably Manhattan, provides solid foundations for the towering skyscrapers of the city. The most unusual feature of the geology is the large variety of precious and semiprecious stones. Among these stones, which occur in veins of granite scattered through the schist, are opals, amethysts, beryls, and garnets; see GEM.

The Park Slope neighborhood, an attractive residential section of Brooklyn. Located on Long Island, Brooklyn is the most populous of the five boroughs. Among its well-known districts are Coney Island, the famous seashore recreational area; aristocratic Brooklyn Heights, overlooking the East River; and Bedford-Stuyvesant, with more than 400,000 residents, one of the biggest black communities in the U.S.

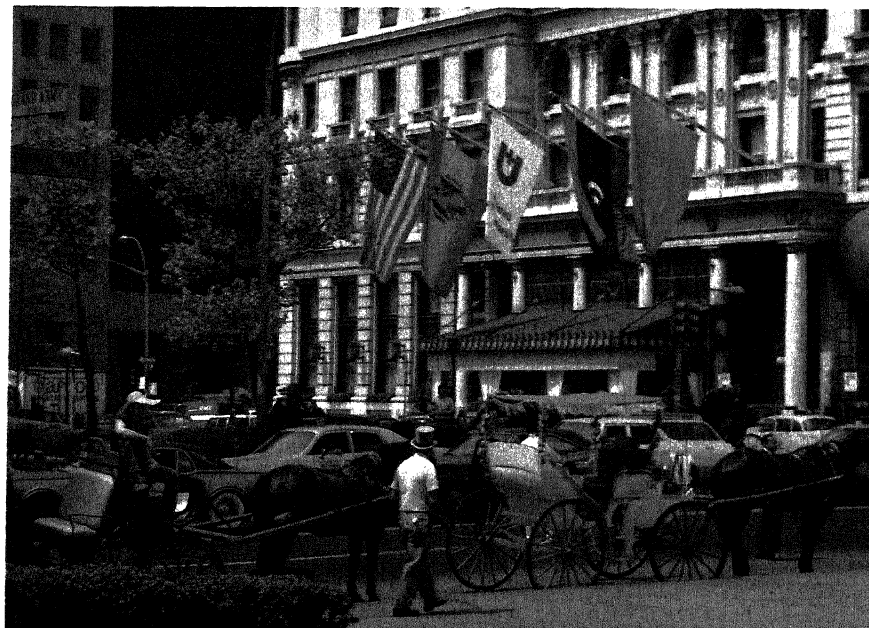
Leo DeWys Inc.



New York City. Plate 1.

Horse-drawn carriages, popular with tourists, wait for customers at 59th Street, near one of the entrances of Manhattan's plush Plaza Hotel. For many, a ride through nearby Central Park and its environs in an open carriage is an indispensable part of a visit to New York City.

Rapho-Photo Researchers



NEW YORK CITY

The Port of New York. The major feature of the topography of New York is its insularity in navigable waters. This feature created severe physical and economic obstacles in the development of the city, particularly in the field of rail and vehicular transportation, but it made possible the emergence of New York as the greatest port in the world. Upper New York Bay, the almost completely landlocked N. portion of New York Bay, is one of the safest and largest natural anchorages in North America. The Narrows (q.v.), a strait separating Richmond and Brooklyn, connects the Upper Bay with the Lower Bay and is spanned by the Verrazano-Narrows Bridge.

New York harbor is traversed by a network of dredged channels. Ambrose Channel, 10 mi. long, 45 ft. deep, and 2000 ft. wide, crosses the Lower Bay from the Atlantic Ocean to the Narrows. Main Channel, or Anchorage Channel, which extends across the Upper Bay to the mouth of the Hudson R., is about $\frac{1}{2}$ mi. wide and from 40 to 90 ft. deep. The Hudson R. estuary, known as the North R., has a channel 43 to 45 ft. in depth, and the East R. channel is 35 to 40 ft. deep. By means of these and other channels all sections of the port, including Jersey City, Newark, and Bayonne, N.J., which form part of the port district, are accessible to ocean-going vessels. The North R. waterfront of Manhattan, the hub of the overseas passenger traffic of the port, is accessible to the largest liners afloat.

The waterfront of New York City is approximately 578 mi. long and is equipped with about 700 piers and wharves, which range up to 1700 ft. in length. Including the side wharfage of these piers, the length of the New York water-

front is about 770 mi. The port areas are equipped with enormous facilities for the loading, discharge, and storage of waterborne freight, with numerous dry docks and ship-repair and shipbuilding facilities, and with extensive facilities for intraport transfer of railway freight.

As indicated in the foregoing, the New Jersey communities abutting on New York harbor comprise an integral part of the port economy. In a large degree this results from the circumstance that only one of the trunk-line railway systems serving New York has major freight terminals within the city. The terminals of the remaining rail systems are situated on the mainland w. of the harbor. As a consequence, a large volume of the cargoes moving in and out of New York must be transhipped between the city and the New Jersey railheads. Until recent years transshipment was accomplished entirely by means of car floats (barges designed to carry railway cars) and lighters. This system created serious problems, including harbor congestion and the utilization of a disproportionate amount of valuable water frontage for railway-marine operations. The Port Authority of New York and New Jersey, established in 1921 as a self-supporting agency of the States of New York and New Jersey, has in recent years completed a number of projects linking the two States to facilitate the flow of commerce in the port district. Among these projects are the Lincoln and Holland tunnels, vehicular tubes under the North R.; the two-level, fourteen-lane George Washington Bridge (q.v.) spanning the Hudson R.; the Bayonne Bridge over the Kill van Kull; and Outerbridge Crossing and Goethals



New York City as it looked in the early 1900's can be seen in this original photograph of the teeming market place of Mulberry Street in lower Manhattan.

National Archives



Bridge, spanning the Arthur Kill. The Verrazano-Narrows Bridge spans the Narrows between the New York boroughs of Brooklyn and Richmond.

The magnitude of shipping operations in New York City is indicated by the fact that, in terms of value, more than half of the foreign trade of the U.S. normally moves through the port. By volume, the foreign trade moving through New York approximates 14 percent of the national total. The domestic waterborne commerce of the port is also enormous, usually surpassing the foreign and domestic traffic of San Francisco, Philadelphia, and Baltimore combined. In a recent year the combined tonnage of domestic and foreign cargoes handled in the port was more than 115,000,000.

Commerce and Industry. Besides being the financial and commercial center of the Western Hemisphere, with vast banking organizations, commodity exchanges, and related facilities, New York is the foremost manufacturing city of the nation. The chief industry is the manufacture of wearing apparel and accessories. Other leading industries include printing and publishing, meat packing, and the manufacture of foods and kindred products, chemicals, electrical machinery, fabricated metal products, textiles, nonelectrical machinery, instruments, paper products, leather goods, primary metals, and transportation equipment. In a recent year

Vehicular traffic is barred from Central Park for some hours every day, during which only bicycles and pedestrians are permitted.

Photo Researchers

the value of manufactures produced in New York City approximated \$8,800,000,000.

Transportation. New York possesses unsurpassed facilities for the transportation of passengers. Intracity transportation is provided by the largest municipally owned and operated transit system in the nation. Subway routes included in this system have a length of almost 240 mi., comprising a network that links all of the boroughs except Richmond. Surface bus routes have a combined length of more than 500 mi. In addition, the city is served by more than 10,000 taxicabs, by numerous privately operated surface lines, by the Long Island Railroad, which provides connections between Manhattan and points on Long Island, by the Port Authority Trans-Hudson Corporation (PATH), which operates (through tubes underneath the North R.) between Manhattan and points in New Jersey, and by the Staten Island Rapid Transit Railway, which serves Richmond.

Interstate and intrastate connections are provided by the railroads with terminals in the metropolitan area. The Penn Central Company, a line formed by the merger of the former New York Central, New Haven, and Pennsylvania systems, is the only trunk-line system with passen-

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ger terminals within the city. It maintains direct lines to important points in the South, the Midwest, upper New York State, and New England. The city contains two of the largest airports in the world, La Guardia Airport and John F. Kennedy International Airport, which are situated in Queens. These airports are the terminals of all the major national and international air lines.

The movement of rapid-transit, railway, vehicular, and pedestrian traffic within and to and from New York City is made possible by a total of about 60 bridges and about 20 tunnels. A ferry line operates between Manhattan and Richmond.

Government. New York is governed according to the provisions of a city charter adopted in 1961. The chief executive of the city is a mayor, elected for a four-year term. A comptroller, also elected for a four-year term, is the chief financial officer of the city. Legislative authority is vested in a city council of thirty-seven members, elected for four-year terms. The mayor of New York has broad powers, including the veto over enactments of the council. He also appoints the heads of the various administrations, departments, boards, and commissions of the city and appoints judges to the New York City Criminal Court and the Family Court.

To a large degree, the administration of the city is conducted by the board of estimate, which consists of the mayor, the comptroller, the president of the city council, and the borough presidents. The last-named officials are elected at large from the boroughs for four-year terms. In the deliberations of the board of estimate, the mayor, comptroller, and president of the city council have four votes each; the borough presidents have two votes each. Municipal judicial authority is vested in civil, criminal, and family courts.

Each of the boroughs of the city has a small measure of local autonomy, which is centered in the office of the borough president.

Population. Between 1910 and 1950 the population of New York increased from 4,766,883 to 7,895,563. In 1960 it was 7,781,984; in 1970 it was 7,867,760. New York, the largest Standard Metropolitan Area, grew in population from 10,694,633 in 1960 to 11,528,649 in 1970.

NEW YORK, POLYTECHNIC INSTITUTE OF, professional undergraduate and graduate school with campuses in Brooklyn, the Bronx, and Farmingdale, N.Y. The institute is the result of a merger in 1973 of the Polytechnic Institute of Brooklyn and the school of engineering and science of New York University (q.v.), both founded in 1854. The institute offers programs

in engineering, science, history of science, management, operations research, meteorology, transportation planning, oceanography, humanities, and social sciences. It awards bachelor's, master's, engineer's, and doctor's degrees. In 1973 the libraries housed more than 232,000 volumes, student enrollment totaled 3500, and the faculty numbered 272.

NEW YORK PUBLIC LIBRARY, THE, one of the largest and best-equipped libraries in the world, situated in New York City, and established in 1895 by the consolidation of the Astor, Lenox, and Tilden libraries. The Astor Library was founded in 1848 by the financier John Jacob Astor (see *under* ASTOR), and at the time of the consolidation contained more than 260,000 volumes valued at nearly \$700,000. The Lenox Library, founded in 1870 by the bibliophile James Lenox (1800–80), comprised about 86,000 volumes, with a total endowment of more than \$500,000. The Tilden Library, which had about 20,000 volumes, was bequeathed by the political leader Samuel Jones Tilden (q.v.), who left more than \$2,000,000 in 1886 for a free library and reading room. An act providing for the construction of a building to house the collections was passed by the New York City government in 1897. The new structure, made of marble in the modern Renaissance style, was officially opened in 1911. Designated a National Historic landmark and a New York City landmark, the central building occupies two blocks on Fifth Avenue, and contains two art galleries and four exhibition areas for rare books, and other materials. Maintenance funds are derived largely from private endowments and contributions.

The library was continuously expanded by the addition of public and private collections to include the New York Free Circulating Library, with eleven branches and a total of 20,000 volumes; the New York Free Circulating Library for the Blind; the Aguilar Library, a collection of Jewish literature; and the Cathedral Free Circulating Library, a Roman Catholic system of five large branches and seven smaller ones.

The library has also benefited from liberal financial contributions of various philanthropists, including a gift of \$3,500,000 from Andrew Carnegie (q.v.) in 1901, \$3,570,000 from John S. Kennedy (1830–1909) in 1909, and \$3,000,000 given by John Davison Rockefeller, Jr. (see *under* ROCKEFELLER), \$16,000,000 by Harry Payne Whitney (1872–1930), and \$1,000,000 by Edward Stephen Harkness (q.v.) in subsequent years. The Carnegie gift enabled the municipal government to erect 39 of the 83 branches the main library had in 1969.

The branch libraries and six mobile units that receive support from city, state, and Federal funds are scattered throughout the boroughs of Manhattan, the Bronx, and Richmond; the remaining two boroughs, Brooklyn and Queens, operate separate library systems.

The New York Public Library is divided into two major parts, the research libraries and the branch libraries. In June, 1972, the research libraries had 5,001,472 volumes and pamphlets, and the branch libraries, 3,141,728. The number of volumes circulated between July, 1971, and June, 1972, totaled 11,787,496, and 11,703,846 persons visited the main building on Fifth Avenue during that same period.

The library has outstanding collections in the fields of American history, the history of New York City, Semitic languages, the history and culture of the Negro people, art, economics, music, and folklore, as well as an extensive collection of pamphlets and some 25,000 current American and foreign periodicals.

A comprehensive file of newspapers reproduced on microfilm is also maintained. Several monthly periodicals are published by the library: the *Bulletin*, devoted to news of its exhibitions and new acquisitions; *New Technical Books*, listing outstanding recent publications in science and technology. The Schomburg Center for Research in Black Culture houses rarities by and about black people throughout the world, with major emphasis on Afro-America, Africa, and the Caribbean area.

All material in the Central Research Library is for use within the building only, but researchers may purchase photographs, photostats, and other reproductions from the Photographic Service.

The library has the largest free circulating picture collection in the world (2,000,000 pictures); the Prints Division houses a representative collection of 15th- to 20th-century prints from all countries; the Spencer Collection consists of richly illustrated books and manuscripts in fine bindings. A reference collection, comprised of books, periodicals, pamphlets, scrapbooks, and clippings on the fine arts, is in the Art and Architecture Division.

A major extension of the New York Public Library is the Library and Museum of the Performing Arts opened at Lincoln Center for the Performing Arts (q.v.) in November, 1965. This special library includes the General Library and Museum, a circulating branch of books, recordings, and music scores; the Children's Library on the performing arts, for children through the seventh grade; and the Research Library, containing comprehensive collections on the thea-

ter, dance, and music, which were formerly housed in the main library on Fifth Avenue.

The New York Public Library has been a long-time pioneer in educational and recreational activities for children. Almost every branch maintains a separate area for children and a trained staff to work with them. Special services are also offered to teen-age youngsters. Discussion groups, film forums, and book-reviewing and study groups are available to adults.

NEW YORK STATE BARGE CANAL SYSTEM, artificial inland waterway comprising the Erie Canal (q.v.), linking Lake Erie and the Hudson R.; the Oswego Canal, linking the Erie Canal and Lake Ontario; the Cayuga-Seneca Canal, linking the Erie Canal and lakes Cayuga and Seneca; and the Champlain Canal, linking Lake Champlain and the Hudson R.

NEW YORK, STATE UNIVERSITY OF, coeducational State-supported institution of higher learning, comprising seventy-two colleges and centers. The university is governed by a board of trustees, but each college and center is locally administered. The university was established in 1948 by an act of the New York State legislature and comprises 4 university centers, 2 medical centers, 13 colleges of arts and science, 3 specialized colleges, 5 statutory colleges located on the campuses of Cornell and Alfred universities, 6 two-year agricultural and technical colleges, and 38 locally sponsored two-year community colleges. In addition, the atmospheric sciences research center on Whiteface Mt., the Ranger School of Wanakena, the Institute for Policy Alternatives in Albany, the Polymer Research Center in Syracuse, the Marine Sciences Research Center in Stony Brook, and the Western New York Nuclear Research Center, Inc., in Buffalo, are part of the university.

Four-year and graduate degree programs are offered in agriculture, business administration, ceramics, dentistry, engineering, forestry, home economics, industrial and labor relations, law, liberal arts and sciences, maritime service, medicine, nursing, optometry, pharmacy, professional museum work, public administration, social work, teacher education, and veterinary medicine, as well as two-year programs in nursing and liberal-arts studies and technical courses in agricultural, business, industrial, and medical technology. The degrees of bachelor, master, and doctor are conferred.

The university libraries contained 9,115,000 bound volumes in 1971-72. In 1973 the combined faculties had 15,000 members, student enrollment totaled 382,800, and the endowment was \$50,000,000.

NEW YORK, THE CITY UNIVERSITY OF

NEW YORK, THE CITY UNIVERSITY OF. See CITY UNIVERSITY OF NEW YORK, THE.

NEW YORK UNIVERSITY, coeducational non-sectarian privately controlled institution of higher learning, located in New York City, chartered in 1831, and opened for instruction the following year as the University of the City of New York. The present name was adopted in 1896. Divisions of the university, in downtown Manhattan, are as follows:

At Washington Square the original site, are The American Language Institute, the school of law (founded 1835), the graduate school of arts and science (1886), the school of education (1890), the College of Business and Public Administration (1900), the Institute of Retail Management (1919), the school of continuing education (1934), the graduate school of public administration (1938), the graduate school of social work (1960), the Courant Institute of Mathematical Sciences (1961; established in 1952 as the Institute of Mathematical Sciences), and the school of the arts (1966). The Elmer Holmes Bobst Library and Study Center, opened in 1973, is one of the largest open-stack libraries in the United States; it contains 2,500,000 volumes.

In 1973 the university sold its 45-acre campus at University Heights, in the Bronx, to the Bronx Community College, an academic unit of the City University of New York (q.v.). Divisions of the university that were on the Bronx campus were changed as follows: the University College of Arts and Science (the original college of the university, founded in 1832) became the Washington Square College and University of Arts and Science; the school of engineering and science, founded in 1854, was merged with the Polytechnic Institute of Brooklyn to become the Polytechnic Institute of New York (q.v.); and the Hall of Fame for Great Americans (q.v.), founded in 1900, was placed under a joint trusteeship managed by the university and the Bronx Community College.

The graduate school of business administration (1916) is located on downtown Wall Street. The Salomon Brothers Center for the Study of Financial Institutions is a part of the school.

The New York University medical center in midtown Manhattan includes among other buildings a hospital (University Hospital, 1963), student residence halls (1957), and structures housing the school of medicine (1841), the institute of rehabilitation medicine (1948), a post-graduate medical school, and other services.

Nearby is a public-health laboratory erected by New York City and occupied jointly by university and municipal services. Also in the vicin-

ity is the university's Brookdale Dental Center, which includes the college of dentistry (1864), founded as the New York College of Dentistry and merged (1925) with the university. A dental clinic and an institute for dental research are also maintained.

The Institute of Fine Arts (1937), a division of the graduate school of arts and science, is located in uptown Manhattan near The Metropolitan Museum of Art (q.v.).

The university confers the degrees of bachelor, master, and doctor. In 1972 the university libraries housed 2,250,000 bound volumes. In 1972 the total student enrollment was 30,186 and the faculty comprised about 5680 persons. The endowment was approximately \$109,000,000.

NEW YORK WORLD'S FAIR. See EXHIBITIONS AND EXPOSITIONS: *Famous 20th-Century Expositions.*

NEW ZEALAND, self-governing country of the Commonwealth of Nations (q.v.), situated in the South Pacific Ocean. It comprises two large islands, namely, North Island and South Island, and numerous smaller islands including Stewart Island, to the s. of South Island. The two large islands and Stewart Island lie within the quadrangle bounded approximately by lat. 34° S. and lat. 48° S. and long. 166° E. and long. 179° E. New Zealand also administers a number of islands lying outside this quadrangle, mainly as island territories. The total area, exclusive of territories, is about 103,740 sq.mi.

THE LAND

New Zealand is a generally mountainous country with several large regions of plains. Two thirds of the area is between 650 ft. and 3500 ft. above sea level; the country has more than 220 named mountains exceeding 7500 ft. in height.

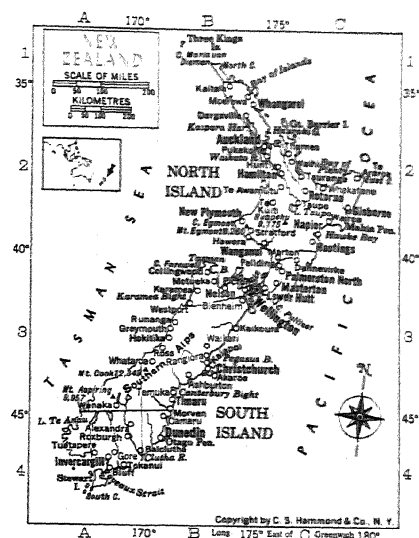
North Island has a very irregular coastline, particularly on its n. extremity, the Auckland Peninsula. In the vicinity of the city of Auckland the peninsula is only 6 mi. wide. The principal mountain ranges of North Island extend along the e. side. A volcanic range in the north-central region has three active volcanic peaks: Mt. Ruapehu (9175 ft.), the highest point on the island; Mt. Ngauruhoe (7515 ft.); and Tongariro (6458 ft.). Mount Egmont (8260 ft.), a solitary, extinct volcanic cone, is situated near the w. extremity of the island. North Island has numerous rivers, most of which rise in the e. and central mountains. The Waikato R. (270 mi. long), the longest river of New Zealand, flows northward out of Lake Taupo (234 sq.mi.), the largest lake in New Zealand, and empties into the Tasman Sea in the w. Numerous mineral hot springs are in the Lake Taupo district.

South Island has a more regular coastline than that of North Island; in the s.w., however, the coast is indented by deep fiords. The chief mountain range of South Island is the Southern Alps, a massive uplift extending in a southwest-to-northeast direction for almost the entire length of the island; seventeen peaks in the range exceed 10,000 ft. in elevation. Mount Cook (12,349 ft.), the highest point in New Zealand, rises from the center of the range, which also has a number of glaciers. Most of the rivers of South Island, including the Clutha R. (210 mi. long), the longest river of the island, rise in the Southern Alps. The Clutha R. is formed by the confluence of two branches originating respectively in Lake Hawea (48 sq.mi.) and Lake Wanaka (75 sq.mi.) and empties into the Pacific Ocean. The largest lake is Lake Te Anau (132 sq.mi.) in the s. part of the Southern Alps. The Canterbury plains in the e. and the Southland plains in the extreme s. are the only extensive lowland areas of South Island.

Climate. New Zealand lies within the Temperate Zone; the climate is generally mild and seasonal differences are not great. The n. end of the Auckland Peninsula has the warmest climate; the coldest climate occurs on the s.w. slopes of the Southern Alps. Rainfall is generally moderate to abundant and, except in a small area in the south-central part of South Island, exceeds 20 in. annually. The heaviest rainfall (about 220 in.) occurs in Milford Sound on the s.w. coast of South Island. The average temperature at Auckland varies between 66.3° F. in January and 51.2° F. in July; the average rainfall is 48.8 in. In Dunedin, on the s.e. coast of South Island, the January and July averages are 58.6° F. and 39.5° F., respectively; the annual rainfall is 29.7 in.

Geology. The islands, which emerged late in the Tertiary Period, contain a notably complete series of marine sedimentary rocks, some of which date from the early Paleozoic Era (q.v.). Much of the topography of New Zealand has resulted from warping and block faulting. Volcanic action also played a part in the formation of the islands, especially on North Island, where the process continues to the present time. Geysers and mineral hot springs occur in the volcanic area, and earthquakes, though usually minor, are fairly frequent there.

Natural Resources. The land is the most important resource of New Zealand. It is ideal for agriculture, dairy farming, and the raising of sheep, all of which predominate in the economy. Forest products are also important. Numerous mineral deposits are found throughout the main island, including coal, gold, pearlite,



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NEW ZEALAND

sand and gravel, limestone, bentonite, clay, dolomite, and magnesite. Much exploratory work is under way in areas that are known to contain petroleum. Deposits of uranium and thorium are believed to be present because these minerals have been found in isolated boulders.

PLANTS. New Zealand plant life is remarkable in that of the 2000 indigenous species, about 1500 are found nowhere else in the world; examples of such unique plants are the golden kowhai and the scarlet pohutukawa. North Island has predominantly subtropical vegetation, including mangrove swamps in the N. The forest, or so-called bush, of North Island is principally evergreen with dense undergrowth of mosses and fern. Evergreen trees include the kauri, rimu, kahikatea, and totara, all of which are excellent timber trees. The only extensive area of native grassland on North Island is the central volcanic plain. The E. part of South Island for the most part is grassland up to an elevation of 5000 ft. Most of the forest is in the W. It is made up principally of native beech and is succeeded by alpine pine vegetation at high altitudes.

ANIMALS. With the exception of two species of bats, no indigenous mammals exist in New Zealand. The first white settlers, who arrived early in the 19th century, found a type of dog and a black rat, both of which had been brought by the Maori (q.v.) about 500 years earlier and are now almost extinct. The only wild mammals at present are descended from deer, rabbits, goats, pigs, weasels, ferrets, and opossums imported by white men. No snakes and few species of annoying insects inhabit New Zealand. The tuatara, a lizardlike reptile with a vestigial third eye, is believed to be a prehistoric survival.

New Zealand has a large population of wild birds, including twenty-three native species. Among the native species are songbirds, including the bellbird and tui, and flightless species, including the kiwi, kakapo, takahe, and weka. The survival of the flightless birds is attributed to the absence of predatory animals. The sparrow, blackbird, thrush, skylark, magpie, and myna are well-acclimated imported species. New Zealand abounds in a great variety of sea-birds and numerous migratory birds.

The rivers and lakes have a variety of native edible fish, including whitebait, eel, lamprey, and freshwater crustaceans, particularly crayfish. Trout and salmon have been imported. The surrounding ocean waters are the habitat of the snapper, flounder, blue cod, hapuku, tarakihi, swordfish, flying fish, shark, and whale, as well as edible shellfish, such as the oyster, mussel, and toheroa.

WATERPOWER. Because of the high relief of the country, most of the streams are swift moving and may be used to generate hydroelectric power. In addition, notably on South Island, ample rainfall, melting glaciers, and numerous large lakes provide large quantities of water and natural reservoirs. Hydroelectric potential is greater, therefore, in South Island, but the demand for such energy is greater in North Island, which is more heavily populated. Since 1965 some of the energy needs of North Island have been met via a direct-current transmission line from South Island incorporating a 25-mi. submarine cable across Cook Strait. Geothermal steam is also being utilized for electric-power generation on North Island. The annual production of hydroelectric power by government-owned plants during the early 1970's was about 12,900,000,000 kw hours, with additional small amounts of power generated by private hydroelectric plants.

THE PEOPLE

More than 90 percent of the population are of British descent. Approximately 7 percent (about 220,000) are Maori (q.v.), a Polynesian group with some Melanesian admixture who migrated to New Zealand about the 14th century. The Maori have adapted themselves to the society and work in all types of industry and the professions. The remainder of the population includes mostly persons of Continental European or Asian birth or descent.

Population. The population of New Zealand (official census 1971) was 2,862,631. About 72 percent of the population (including more than 95 percent of the Maori) resided on North Island. In the early 1970's, according to latest available statistics, the population density averaged 26 persons per sq.mi.; the density of North Island was 42.7 per sq.mi. and that of South Island, 13.2 per sq.mi. About 75 percent of the people lived in urban areas, and more than half of these in the four largest cities and their environs; see *Principal Cities*, below.

Political Divisions. New Zealand is divided into thirteen administrative areas, which replaced the nine former provincial districts. On North Island the areas include Northland, Central Auckland, South Auckland-Bay of Plenty, East Coast, Hawke's Bay, Taranaki, and Wellington; on South Island, Marlborough, Nelson, Westland, Canterbury, Otago, and Southland.

Principal Cities. According to the latest official census (1971) the populations of the largest cities of New Zealand are: Auckland, seaport and distribution center for the dairy region (151,580); Christchurch, the wheat and grain



center (165,637); Wellington, the capital city and center of interisland and coastal shipping (135,677); and Dunedin, a wool and gold center (82,235).

Religion and Language. Approximately 80 percent of the population are Christian. The major denominations (in order of size) are the Church of England, Presbyterian, Roman Catholic, and Methodist. Most of the Maori are members of the Ratana and Ringatu Christian sects. Jews constitute a small minority.

English is the official language. The Maori speak Maori, a Polynesian language, but they learn English as a second language.

Education. Education is free and compulsory for children between the ages of six and fifteen years, but a child may enter school at five and continue until he is nineteen. In some areas free kindergartens are maintained for children between three and five years of age. The primary course consists of infant classes during the first two years and 6 annual grades designated standards 1, 2, 3, and 4 and forms I and II. Secondary education is available free to all children who have completed form II or who have attained the age of fourteen. On the completion of the third or fourth year of secondary education, pupils who do not desire to enter a university may take the examination for the so-called school

Wellington, capital of New Zealand, has a large deep harbor that helps to make it the country's principal seaport.

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certificate, that is, a certificate attesting completion of the secondary course. The prerequisite for admission to university study is either completion of a four-year course at an approved secondary school or the passing of the university entrance examination.

ELEMENTARY AND SECONDARY SCHOOLS. The number of schools in New Zealand mounted steadily during the 1960's. All types of schools increased in number except the Maori village schools. The decline in the number of Maori schools was due in part to the consolidation of a number of small schools into central schools and in part to the fact that a growing number of Maori students were attending public primary schools. According to latest available figures, in the early 1970's New Zealand had about 2200 public primary schools with about 17,000 teachers and an annual enrollment of about 455,000 students. About 125 Maori village schools had nearly 400 teachers and were annually attended by about 9000 pupils. About 340 approved private primary schools had more than 50,000 students and 1600 teachers. Public secondary schools, with approximately 9100 teachers holding classes in 220 buildings, were annually attended by some

NEW ZEALAND

157,000 students. About 60 district high schools with more than 4800 students and about 215 technical high schools with about 85,000 students also existed. A correspondence school for those in remote areas had about 140 teachers and rendered service to some 6000 students.

UNIVERSITIES AND COLLEGES. The university system in New Zealand in the early 1970's comprised six separate universities and a university college of agriculture. The seven institutions were the University of Auckland, Waikato University (at Hamilton), the Victoria University of Wellington, Massey University (at Palmerston North), the University of Canterbury (at Christchurch), the University of Otago (at Dunedin), and Lincoln College, a constituent agricultural college of the University of Canterbury. Under the Universities Act of 1961 a university grants committee advises the government on the needs of university education and research and also allocates the grants of money that it recommends for appropriation by the parliament. The six universities and the agricultural college had a combined annual enrollment in the early 1970's of about 34,500 students. Nine teachers colleges were also in operation, and an extensive adult-education program throughout the country was being conducted by the National Council of Adult Education.

Culture. The earliest cultural tradition in New Zealand was that of the Maori. The literature consisted of history, tales, poems, and myths handed down by oral tradition. The indigenous art of New Zealand was also Maori. European settlers, particularly the English, brought with them their own traditions, colored by an unsettled, expatriate sentiment which was a strong influence in the cultural life of the country until the early 20th century, but which has since given way to a more confident, nationalistic spirit.

The arts, literature, and music have been given great stimulus by the Queen Elizabeth II Arts Council of New Zealand, created in October, 1963. The functions of the council are to foster artistic and cultural undertakings of all kinds and to make them accessible to the public.

LIBRARIES AND MUSEUMS. The National Library Act of 1965 established the National Library of New Zealand by combining several library systems. The National Library Service in Wellington comprises three major divisions with a total collection of about 2,600,000 volumes. The Auckland Public Library contains about 505,000 volumes, including Maori works. Other leading libraries include the General Assembly Library, Well-

ington (300,000 vol.), the Dunedin Public Library (208,000 vol.), the Canterbury University Library in Christchurch (200,000 vol.), and the Alexander Turnbull Library in Wellington (120,000 vol.). All government records of permanent value are preserved in the National Archives in Wellington.

Leading art galleries and museums are found in most large cities, but the oldest institutions are located in Auckland. The Auckland City Art Gallery, opened in 1887, and the Auckland Museum, opened in 1852, contain notable collections, and the National Art Gallery in Wellington is noted particularly for its Australian and New Zealand paintings. Outstanding natural history and ethnological collections are found in the Dominion Museum in Wellington, Canterbury Museum in Christchurch, and Otago Museum in Dunedin.

LITERATURE. Soon after Europeans became aware of New Zealand, the orally transmitted myths and legends of the Maori were supplemented on a more factual level by accounts of the country given in the writings of the early voyagers, especially Captain James Cook (q.v.), who observed New Zealand in 1769. Later, the early settlers, including the British author Samuel Butler (q.v.), contributed some graphic descriptions of pioneer life. On the whole, however, the early New Zealanders felt too geographically remote and too cut off from their cultural tradition to write, and until very recent times, Katherine Mansfield (q.v.), herself an expatriate, was the only New Zealand writer with an international reputation. The economic depression of the 1930's, which was particularly harsh in New Zealand, brought a sense of national identity, and since then poets, short-story writers, and novelists have flourished.

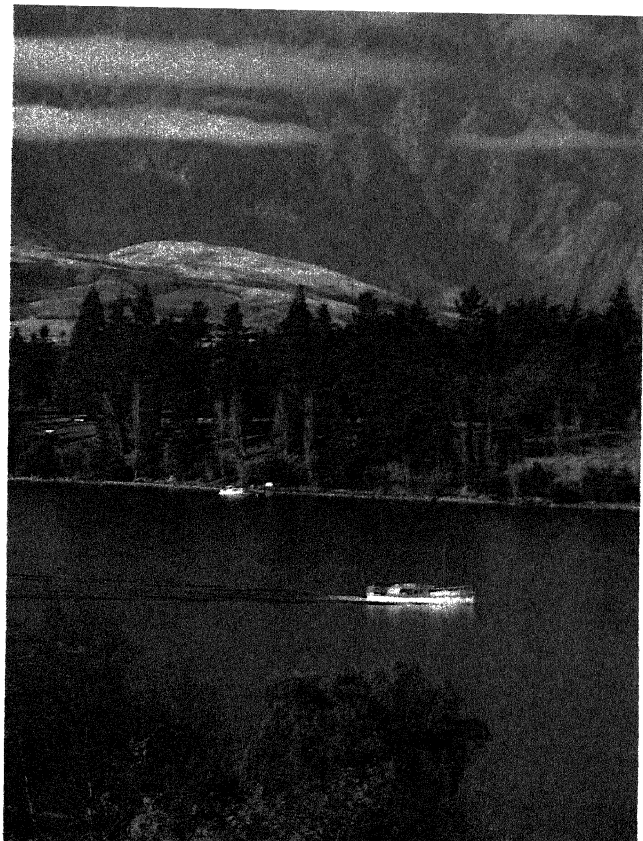
ART. Until recent years the art of the Maori was regarded as having only ethnological value. The settlers brought little in the way of artistic skills or inclinations. As a consequence very little feeling for art existed in New Zealand before World War II. Since that time, however, an upsurge of interest in art and in the crafts (especially pottery) has occurred. The art of the Maori, particularly their elaborate painted wood carvings, have been reassessed and have strongly influenced other New Zealand artists.

THE ECONOMY

The national economy of New Zealand is largely dependent on wool, a major export. Any negative fluctuation in world price and demand affects the economy. In the 1960's the unexpected decline of the world demand for wool seriously affected the balance of payments of New Zea-

A view of the Remarkable Mountains on Lake Wakatipu, at Queenstown, on South Island, New Zealand. The mountains, exceptionally craggy and sierran, extend southward from the Kawarau River to the Hector Mountains. The Queenstown district is popular with vacationers, who go there to enjoy skiing, hunting, fishing, boating, and other pastimes.

**Morton Beebe and Associates—
Photo Researchers**



land. In a recent year, annual budget figures show about \$1,850,000,000 in revenue, and \$1,873,000,000 in expenditures.

Agriculture. New Zealand is predominantly an agricultural country. Modern methods and machinery are used extensively, and the productivity of the country is consequently among the highest in the world. The land is ideally suited for dairy farming and for raising sheep and beef cattle because winter housing for livestock is unnecessary and grass grows nearly the whole year. Farm production is divided about equally between pastoral production and dairying. Annual output of the main crops in the early 1970's included wheat, 324,000 tons, barley, 227,000 tons, and oats, 49,000 tons. Other important crops are apples, pears, tobacco, potatoes, and peas. The livestock population included about 59,000,000 sheep, 9,000,000 head of cattle, and 600,000 pigs. Farm horses have been almost completely replaced by tractors.

Forest and Fishing Industries. Annual timber production in the early 1970's was about

300,000,000 cu.ft. Other forestry products produced annually in the same period were approximately 580,000 tons of wood pulp, 218,000 tons of newsprint, and about 250,000 tons of other paper and paper board. Most of the native forests were denuded in the early years of colonization. An extensive reforestation program has utilized imported varieties of fast-growing trees instead of native New Zealand trees, most of which are slow-growing. The oldest stand of a North American species of pine in the Kaingaroa State Forest (283,000 acres), reputedly the largest planted forest in the world, is exploited at two plants owned and operated jointly by the Dominion government and private industry.

The most important freshwater and marine species taken are crayfish, mussels, snappers, kahi, hapuku, flounder, and sole. In the early 1970's the annual catch of the fisheries was approximately 66,000 tons, of which crayfish and oysters accounted for about half. Much of the fishing is done by motor trawlers.

NEW ZEALAND

Mining. Coal and gold are the only minerals of substantial economic importance. In the early 1970's the annual production was approximately 2,300,000 tons of coal and 11,200 fine oz. of gold. Iron, manganese, and tungsten ores are mined in small quantities; sulfur, mercury, and asbestos are produced only when world prices are high. Production of petroleum amounted to 16,300,000 gal., and of natural gas, 3,750,000,000 cu.ft. Building stone and materials are plentiful.

Manufacturing. In the early 1970's about 303,000 persons were employed in manufacturing. The principal manufactures are meat and dairy products, paper and paper products, machinery, clothing, lumber, motor vehicles, electrical machinery, and printing and publishing. Manufacturing has increased steadily, but New Zealand has insufficient manpower and raw materials to support much heavy industry.

Currency and Banking. Under the Decimal Currency Act of 1964 a system of decimal currency was introduced in New Zealand on July 10, 1967, with the dollar as the monetary unit. The New Zealand dollar, divided into 100 cents (N.Z.\$1 equals U.S.\$1.49; 1973), is equivalent to the previous 10 shillings.

Although the Reserve Bank of New Zealand has the sole power of issue, several commercial banks and trustee savings banks operate, as does the Post Office Savings Bank. The Reserve Bank, the Post Office Savings Bank, and the Bank of New Zealand, which is the largest of the commercial banks, are owned and operated by the government. The government also takes part in commercial credit through the State Advances Corporation, which lends money at low interest to farmers, home builders, and businessmen.

Commerce and Trade. The value of exports for New Zealand in the early 1970's totaled about \$1,685,000,000 annually. Great Britain is a leading trade partner. The United States, Japan, and Australia also are important customers. New Zealand is the largest exporter of dairy products in the world and is second only to Australia in the export of wool. Other important exports are hides and frozen lamb and mutton. Imports in the early 1970's totaled about \$1,590,000,000 annually. Chief imports are manufactured goods, heavy machinery, oil, chemicals, iron, steel, and textiles. Imports come mainly from Great Britain, Australia, the U.S., Japan, and West Germany. New Zealand tariffs are low; about half of the manufactured goods are imported free of duty.

Transportation and Communications. Public transport facilities are good even in remote dis-

tricts. In the early 1970's New Zealand had about 60,000 mi. of roads and 3000 mi. of railroads (mostly steam). Ships provide fast overnight service between North Island and South Island and along the coasts. In this period about 920,000 private cars were registered. Air transport is widely used, with numerous airfields located throughout the country to serve private pilots. All mail, telephone, radio, and cable services are owned by the Post and Telegraph Department. In the early 1970's about 1,300,000 telephones were in use. Radios numbered about 715,000, and New Zealanders had about 700,000 television receivers.

Labor. Of a total labor force of about 1,123,000 persons in the early 1970's, about 16 percent were engaged in agriculture and 24 percent in manufacturing. More than 345 unions of industrial workers had a combined membership of about 386,000. The standard of living was high and, as the labor force was insufficient to meet the demand, little unemployment existed. Industrial laborers worked a forty-hour week.

GOVERNMENT

Executive action nominally is taken in the name of the governor-general, who is appointed by the British crown. The governor-general derives his authority from the Executive Council, which is composed of the governor-general himself, the prime minister, the ministers heading the various governmental departments, and ministers without portfolio, that is, without departmental responsibility. Executive decisions are made by the cabinet, which consists of the prime minister and the ministers in charge of departments.

Health and Welfare. All workers, including those on farms, are guaranteed a two-week annual paid vacation. A straight deduction from wages finances social-security benefits, which include hospitalization and medical care, children's allowances, unemployment benefits, and pensions for disabled workers, widows, the blind, and all persons who are over the age of sixty-five.

Legislature. The parliament, known also as the General Assembly, consists only of the House of Representatives. A second house, the Legislative Council, was abolished in 1950. The House of Representatives is composed of 80 European (that is, non-Maori) and 4 Maori members who are elected by universal adult suffrage for three-year terms. The prime minister and other ministers are selected from among the parliamentary members of the majority party. The government may continue in office only so long as it retains the confidence of the House of Representatives.

Political Parties. The principal political organizations are the Labour Party and the National Party. The former favors a limited degree of nationalization and strong credit controls. The program of the latter strongly supports free enterprise and opposes state socialism. Both parties advocate increased social-security benefits and government assistance for housing and land settlement.

Local Government. New Zealand is divided into 122 counties. Some small offshore islands, however, are not incorporated into any county. The counties exercise authority mainly in areas of scattered population. Where population is denser, local government is conducted by boroughs, independent town districts, or cities. In the early 1970's the country had 138 boroughs and cities.

Territories. Outside of the main islands New Zealand possesses territories located in a wide range of latitudes in the Southern Hemisphere, from the Tropics to Antarctica. The Department of Island Territories governs a number of islands. Some of those within the official boundaries are the Chatham Islands and Campbell Island. Outside of the official boundaries the department governs the Tokelau group and the Cook Islands. Niue, one of the Cook group, is separately administered, with a resident commissioner and an assembly. New Zealand claims the Ross Dependency (q.v.) in Antarctica, but this claim is not recognized by the U.S. After World War II New Zealand administered Western Samoa (q.v.) under a United Nations trusteeship until it became independent in 1962. New Zealand, Great Britain, and Australia shared a U.N. trusteeship of the island of Nauru (q.v.) until 1968, when it achieved independence.

Judiciary. The highest court in New Zealand is the court of appeal, which exercises appellate jurisdiction only. Decisions of the court are final unless leave is granted to appeal to the privy council in Great Britain. The principal trial courts are the supreme court and the magistrates' courts. Justices of the peace in some cases may try minor criminal charges. Specialized courts determine questions relating to labor disputes, workmen's compensation, and land valuation in cases of condemnation.

Defense. In 1971 the army, navy, and air force were coordinated under the ministry of defense. The army numbers 5600 regular personnel and 11,500 territorial personnel. Regular and reserve navy personnel total about 2800 and 2500, respectively. The air force has 4400 regular and 1800 nonregular personnel.

HISTORY

New Zealand was discovered and named in 1642 by the Dutch mariner Abel Janszoon Tasman (q.v.). The British explorer Captain James Cook (q.v.) visited the islands in 1769 and took possession of them for Great Britain, but nearly seventy-five years elapsed before the British government recognized his claim.

Mori and Maori. The inhabitants of New Zealand at the time of Tasman's visit were the Maori, who about the 14th century A.D. had emigrated to North Island, probably from Tahiti, in a fleet of large canoes. Maori oral history credits the discovery of New Zealand to Kupe, a Maori navigator who came by canoe in the middle of the 10th century. At that time the islands were uninhabited, but before the Maori emigration a dark-skinned race, the Mori, of whose origin nothing is known, settled on the eastern coast of North Island to hunt the moa, a 12-ft.-tall, wingless bird, which is now extinct. Some of these people were absorbed into the Maori population; the remainder were driven out and allowed to settle in the Chatham Islands, where the last survivor is said to have died in the mid-20th century. The Maori spread out along the coast and the rivers on both the main islands, although they were more numerous on the North Island.

Early in the 19th century British missionaries and whaling men, despite fierce opposition from the Maori, established settlements and trading posts in New Zealand, chiefly among the Bay of Islands on North Island. Systematic immigration began in 1839-40 under the auspices of the New Zealand Company, which had been organized in London.

British Sovereignty. By the terms of the Treaty of Waitangi, signed in 1840 by a British representative and fifty Maori chieftains, Great Britain formally proclaimed sovereignty over the islands and agreed to respect the land-ownership rights of the Maori, who placed themselves under the protection of the British government. At the same time New Zealand was made a dependency of New South Wales, Australia. In 1841 it was constituted a separate Crown Colony.

Colonization continued apace during the ensuing decades. Disputes between the newcomers and the Maori over land claims led ultimately to violent Maori uprisings between 1845 and 1848 and between 1860 and 1870. After that date, however, colonial authorities pursued a conciliatory policy that resulted in the establishment of permanent peace between the European and native populations. The discovery of

NEW ZEALAND

alluvial gold in 1865 caused a new influx of immigrants, many of whom settled down to farming when the deposits of alluvial gold were exhausted. Sheep raising and gold mining were the main sources of the country's wealth in the latter part of the 19th century. The introduction of refrigerated ships in 1882 enabled New Zealand to export fresh meat, thus stimulating settlement and more intensive farming.

Parliamentary Government. A central government with an elective parliament and a cabinet was established in New Zealand in 1856. During most of the 19th century political power was held alternately by liberals, who instituted manhood suffrage and compulsory education, and by the conservatives, mainly large landholders. In 1891, following the failure in the previous year of a maritime strike, trade-union leaders gave their support to the liberal faction. A series of liberal governments continued uninterruptedly in power until 1912, enjoying labor support until a separate Labour Party was organized in 1910. These governments, first under the journalist John Ballance (1839–93) and, after his death, under Richard John Seddon (1845–1906) and Sir Joseph George Ward (1856–1930), effectuated a program of land reform and social legislation that gained New Zealand worldwide recognition. Large speculative landholdings were broken up under the provisions of a number of statutes that enabled the government to acquire large holdings for subdivision and authorized the purchase of small landholdings on long-term mortgages. In addition, other legislation established minimum rates of pay and provided for the compulsory arbitration and settlement of labor disputes. In 1893 New Zealand became the first country to grant woman suffrage. During this period of liberal-labor dominance the foundation of the social-security system was laid.

Early 20th Century. In 1907 New Zealand officially was designated a dominion, although its form of government was unchanged. The conservatives, campaigning as the Reform Party, regained power in 1912.

During World War I a coalition of the Reform and Liberal parties governed the country. In the war New Zealand furnished 124,211 men for the British forces, of whom 100,444 served overseas. These troops fought in Egypt and in the Gallipoli and Dardanelles Campaign (q.v.) of 1915; the Australian and New Zealand Army Corps became known popularly as Anzac (q.v.). In 1916 New Zealand units organized as a separate division arrived in France in time for the Battle of the Somme, and the Mounted Rifles later served

in the campaign in Palestine. The losses of New Zealand in World War I exceeded 16,000 men killed and 40,000 wounded.

The collapse of a speculative land boom that had flourished after the war was an important cause of the economic depression from 1921 to 1926. The economic distress was aggravated by the worldwide depression beginning in 1930. In the parliamentary elections of 1935 the Labour Party won a majority over the National Party, which had been formed in 1931 by a coalition of the Liberal and Reform parties. The new government, under the labor leader Michael Joseph Savage (1872–1940), nationalized parts of the economy and expanded social security.

World War II and Asia. With the start of the war in 1939, New Zealand imposed wage and price controls and generally emphasized financial stability rather than social progress. New Zealand contributed a larger percentage of the population to the armed services than any of the Allies except Great Britain. The army saw service in Greece, Cyprus, North Africa, Italy, and the Pacific theater of operations. The air force was active in all theaters. The casualties of New Zealand exceeded 11,600 dead and 15,700 wounded.

The power of the Labour Party came to an end on Nov. 30, 1949, when the National Party emerged victorious in general elections. The new government promulgated a program more favorable to private enterprise.

In the arena of foreign affairs New Zealand participated (1950) in the Colombo Plan (q.v.) for Southeast Asia and in 1952 concluded the so-called ANZUS mutual-defense pact with Australia and the U.S. With seven other countries, New Zealand signed the Southeast Asia collective-defense treaty on Sept. 8, 1954; see SOUTHEAST ASIA TREATY ORGANIZATION. New Zealand forces served with the United Nations forces in Korea and Cyprus, and token forces have served in other areas of conflict.

The Economy in the 1960's. The Labour Party was returned to power in the general elections of November, 1957, but its accession corresponded with the beginning of the economic crisis that was to color the 1960's, a crisis caused partly by a decline in payments for exports, particularly wool. The National Party recaptured parliament in 1960 and under the leadership of Prime Minister Keith Jacka Holyoake (1904–) retained its majority in 1963 and 1966.

Balance-of-payments difficulties and inflationary pressures made the Holyoake government reluctant to tamper seriously with many of the economic controls (including some price

controls) imposed by Labour, but it did relax import restrictions. Under a free-trade agreement signed in 1965, duties on many of the commodities traded between the two countries were to be eliminated in 1974.

The 1970's. Early in 1972 Holyoake retired, and in elections held in November Labour swept back to power and the party leader Norman Eric Kirk (1923–) became prime minister. In January, 1973, Kirk met with Prime Minister (Edward) Gough Whitlam (1916–) of Australia and pledged closer cooperation between their nations.

In other foreign relations, New Zealand in 1973 established diplomatic ties with the People's Republic of China and saw widespread national protests against the atomic tests carried out by France in the South Pacific Ocean.

NEY, Michel, Duc d' Elchingen, Prince de la Moskova (1769–1815), Marshal of France, born in Saarlouis. He enlisted as a cavalryman in the French army and in 1796 was made general of brigade. On the establishment of the empire he was made marshal of France and in 1805 was created duke of Elchingen. He distinguished himself in the invasion of Moscow in 1812 and was named prince of Moscow. In 1815 after the capitulation of Paris, when Napoleon I (q.v.), Emperor of France, returned to France after escaping from Elba, Ney was sent to oppose Napoleon's advance. Instead Ney deserted the Bourbon monarchy and with his army joined Napoleon's forces. On June 16, 1815, at Quatre-Bras, a village in Belgium, Ney was defeated by the British general Arthur Wellesley, 1st Duke of Wellington (q.v.), in a decisive battle of the Waterloo campaign; see WATERLOO, BATTLE OF. When Ney returned to Paris, he was tried and condemned to death for high treason.

NEZ PERCÉ, leading North American Indian tribe of the Shahaptian (q.v.) linguistic stock. The tribe formerly occupied a large territory in southeastern Washington, northeastern Oregon, and central Idaho. The name Nez Percé (Fr., "pierced nose") was given by French explorers and missionaries because the tribe practiced nose piercing in order to wear nose pendants.

The Nez Percé followed an economy based on fishing, especially for salmon, and on vegetable staples such as the bulbs of the camas plant, wild roots, and berries. After about 1700 they also kept horses and hunted buffalo. In winter they lived along river banks in villages of long houses built of bark, mats, and skins; in summer they camped in the mountains and in the great upland camas meadows. They practiced some weaving and the decorating of buffalo skins

with paint and porcupine quills. Their principal religious ceremony was a dance in honor of the Guardian Spirit, their presiding deity. War dances were also performed. The entire tribe was divided into more than forty bands, each led by a chief whose power depended solely upon his personal popularity. Marriage was generally outside the band or group.

In response to the tribe's request for instruction in Christianity, a Protestant mission was established among the Nez Percé at Lapwai, Idaho, in 1837. In 1855 the Nez Percé made a treaty with the United States, ceding the greater portion of their territory to the U.S. government and receiving a reservation that included the Wallowa Valley in Oregon. Subsequently gold was discovered in the region, and the tribe was forced to agree to surrender all its lands and to return to a reservation at Lapwai. A band led by Chief Joseph (about 1840–1904), whose Indian name was Hinmaton-Yalaktit, refused to accept the agreement and in 1877 was victorious in a battle with federal troops. Joseph then led his band, which included women and children, on a retreat of more than 1000 mi., and although pursued by federal troops that greatly outnumbered them, the Indians won several engagements. About 30 mi. from the safety of the Canadian border, however, Joseph and his band were captured. They were sent to the Indian Territory (q.v.) where many died. Some of the survivors were later permitted to return to Idaho, where the majority of the tribe now lives on the Nez Percé Reservation. Joseph and the remainder were sent to Colville Reservation in northern Washington.

NEZ PERCÉ NATIONAL HISTORICAL PARK, area of historic interest in northwestern Idaho, consisting of twenty-two sites that preserve, commemorate, and interpret the history and culture of the region once inhabited by the American Indian tribe, the Nez Percé (q.v.). Of particular interest are a portion of the route of the Lewis and Clark Expedition (q.v.); the site of the first school and church in Idaho, at Spalding; and the battlefield at White Bird where the Nez Percé defeated a Federal force in 1877. The park covers 2180.50 acres of which 1836.64 acres are under Federal control. It was established in 1965 and is administered by the National Park Service (q.v.).

NGO DINH DIEM. See VIETNAM: *History*.

NIACIN. See VITAMIN: *Vitamin B Complex: Niacin*.

NIAGARA, river of w. New York and s.e. Ontario, Canada, about 55 km (34 mi.) long. It issues from Lake Erie at Buffalo, N.Y., and flows N.

NIAGARA FALLS

to Lake Ontario, forming part of the United States-Canadian boundary. Near its head the river divides into two channels, between which lies Grand Island, N.Y. The channels merge just beyond the island, and the river soon passes over Niagara Falls. The Whirlpool Rapids are a few miles n. of the cataract. During its course the Niagara, which is the main drainage outlet of the four upper Great Lakes (q.v.), makes a descent of about 99 m (326 ft.), about one half of which occurs at the waterfall. The river is navigable except in the region of the waterfall and rapids.

NIAGARA FALLS, city and port of entry, in Niagara Co., w. New York, on the Niagara R. opposite Niagara Falls, Ontario, Canada. It is an important manufacturing center, producing metals, chemicals, machinery, forest products, and processed food. Located at the American Falls (see NIAGARA FALLS, waterfall), the city also is a major tourist center; several parks are grouped in the New York State Niagara Reservation (established 1885). Niagara University (1856) is nearby. The site of the city was visited by Father Louis Hennepin (q.v.) in 1678, and the French built a fort there in 1745. The British captured the area in 1759, and the U.S. settlement of Manchester was founded there in 1805. Held by the British during the War of 1812, the settlement was renamed Niagara Falls in 1848; it was incorporated as a city in 1892. Pop. (1970) 85,615.

NIAGARA FALLS, city and port of entry, s.e. Ontario, Canada, on the Niagara R. opposite Niagara Falls, N.Y. It is a major industrial center, manufacturing forest products, processed food, chemicals, abrasives, silverware, and machinery. The city also is a popular tourist center overlooking the Canadian, or Horseshoe, Falls (see NIAGARA FALLS, waterfall). Points of interest include Queen Victoria Park, adjacent to the cataract; Niagara Falls Museum, with collections of art and historical and natural-science materials; and Lundy's Lane Historical Museum, with displays on Indian and military history. The city is connected with Niagara Falls, N.Y., by three bridges, including the famous Rainbow Bridge (1941). Originally called Elgin, the community was renamed Clifton in 1856 and was given its present name in 1881. Niagara Falls was incorporated as a city in 1904, and it greatly expanded in area in 1963 by merging with Stamford township. Pop. (1976) 69,423.

NIAGARA FALLS, great waterfall on the Niagara R., in w. New York and s.e. Ontario, Canada. One of the world's most memorable natural sights, it consists of two cataracts—the Cana-

dian, or Horseshoe, Falls (49 m/161 ft. high), on the Canadian side of the river, and the American Falls (51 m/167 ft. high), on the U.S. side. The waterfalls are separated by Goat Island, N.Y. The crestline of the crescent-shaped Canadian Falls, which carries about nine times more water than the U.S. cataract, is about 790 m (2592 ft.) long, and the fairly straight crest of the American Falls measures about 305 m (1001 ft.). A small section of the American Falls near Goat Island is also known as Bridal Veil Falls.

Niagara Falls was formed about 12,000 years ago, when glaciers retreated northward, allowing water from Lake Erie to flow over the Niagara Escarpment, a ridge that extends from s. Ontario to Rochester, N.Y. Since that time, erosion has slowly pushed the waterfall about 11 km (7 mi.) upstream, forming the Niagara Gorge. At present the Canadian Falls is receding at an average yearly rate of about 1.5 m (5 ft.), and the American Falls is being cut away at an annual pace of about .15 m (.5 ft.). The Canadian Falls erodes at a faster rate mainly because it carries more water. In 1954 a considerable portion of the American Falls broke off, creating a large talus, or rock slope, at the base of the cataract. In order to study ways of preventing further rock-falls and to remove some of the talus, the American Falls was "shut off" for several months in 1969 by a dam built between the U.S. mainland and Goat Island.

Niagara Falls is a great tourist attraction, luring millions of visitors each year. The falls may be viewed from parks located on either side of the river, from observation towers, from boats, from Goat Island, and from the Rainbow Bridge, located a short distance downstream. Visitors also may enter the Cave of the Winds, situated behind a curtain of falling water near the base of the American Falls. The American Falls is illuminated by multicolored lights for several hours after dusk.

Samuel de Champlain (q.v.), a French explorer, probably visited Niagara Falls in 1613. Father Louis Hennepin (q.v.), a Flemish monk, is known to have visited the waterfall in 1678; he later published an eyewitness description of it. **Power Development.** The Niagara's large volume of flow, averaging about 5520 cu.m (194,940 cu.ft.) per second, plus its steep drop, give the river great power potential. The waterpower probably was tapped first in 1757, when Daniel Chabert Joncaire built a sawmill on the upper river. In 1853 work started on a hydraulic canal to divert the waters of the upper river to drive machinery in mills and factories situated below Niagara Falls. In 1875 the initial flour mill pow-

ered by the canal water was opened, and in 1881 the first hydroelectric generator was installed along the waterway. The first large-scale hydroelectric facility, the Edward Dean Adams Power Plant, was opened on the U.S. side in 1896.

In 1950 the U.S. and Canada signed a treaty fixing the amount of water that could be diverted from the river for power generation, and soon thereafter two major hydroelectric projects were constructed. The Canadians built the twin Sir Adam Beck-Niagara generating stations (completed 1958; capacity, with associated pumped-storage facility, 1,815,000 kw) at Queenston, Ontario. The Power Authority of the State of New York constructed the Robert Moses-Niagara Power Plant (completed 1963; capacity, with associated pumped-storage facility, 2,400,000 kw) near Lewiston, N.Y. Both projects, each located about 7 km (4.3 mi.) below Niagara Falls, are driven by water diverted just above the falls and conveyed by underground conduits and canals to the turbines; the associated pumped-storage facilities are run by river water stored in adjacent reservoirs. Much of the hydroelectricity is consumed by industries in the nearby cities of Niagara Falls, N.Y., and Niagara Falls, Ontario.

NIAMEY, city and capital of the Niger Republic, on the Niger R., about 480 miles N.W. of Lagos, Nigeria. A river port and road and trade center, Niamey is the southern terminus of a short railroad N.W. to Tillabery. The city manufactures pottery and bricks, leather goods, textiles, charcoal, metal products, soft drinks, and milled grain. Livestock, hides and skins, grain, vegetables, and locally made mats and textiles are exported. Niamey is the site of a teachers' college, a technical school, a branch of the Institut Français d'Afrique Noire, with a museum, and a sports stadium. A French fort since 1902, the city succeeded Zinder as capital of the military territory. From 1927 to 1958 it served as capital of the autonomous Niger Territory. Founded at an unknown time as Niamma, it was later called Niame until the arrival of the French. Pop. (1968 est.) 78,991.

NIAM-NIAM. See ZANDE.

NIBELUNGENLIED, medieval German epic poem of unknown authorship, written in Middle High German in the early 13th century; see EPIC POETRY. The poem is a composite of Norse and Teutonic mythology and the early history of the Kingdom of Burgundy. Several other versions exist of the material comprised in the *Nibelungenlied* ("Song of the Nibelungs"), the principal one being the Icelandic prose epic *Volsunga Saga* ("Saga of the Volsungs"), which

emphasizes the mythological and primitive elements of the material common to both; the *Nibelungenlied* stresses the historical material. Parts of both the *Nibelungenlied* and the *Volsunga Saga* were combined by the 19th-century German composer Richard Wagner (q.v.) for his operatic tetralogy *Der Ring des Nibelungen* ("The Ring of the Nibelung").

The hero of the *Nibelungenlied* is Siegfried, a German warrior and hero. He kills two Burgundian chiefs of the Nibelung family and takes their magic sword, their hoard of gold, upon which in dying they put a curse, and their *tarn-kappe*, a cape that makes its wearer invisible. He goes to Worms, the Burgundian capital, to court the beautiful Kriemhild, sister of the Burgundian king Gunther. Hagen, a wily and treacherous counselor of Gunther, plans to gain possession of the Nibelung hoard and tells Gunther and his brothers that Siegfried has killed other Burgundian monarchs and is not to be trusted. Siegfried wins Gunther's confidence, however, by giving valuable aid to the Burgundians in a war against the Saxons. Gunther agrees to a marriage between Siegfried and Kriemhild on condition that Siegfried first help him to win Brunhilde, Queen of Iceland. Siegfried and Gunther go to Iceland, where, rendered invisible by his cape, Siegfried overcomes Brunhilde in physical combat; thinking it is Gunther who has beaten her, she consents to marry him. At Worms Siegfried marries Kriemhild and Gunther marries Brunhilde.

Hagen persuades Gunther to let him kill Siegfried, winning the consent of the king by pointing out that although Siegfried is only his vassal, he is generally regarded as Gunther's superior. Gunther's hatred of Siegfried is also aroused because Brunhilde has discovered that she was tricked into marrying the Burgundian king, and despises him. Through treachery Hagen slays Siegfried at a royal hunt; Kriemhild swears to avenge Siegfried's death. She is powerless, however, because Hagen seizes the Nibelung hoard that Kriemhild inherited and with which she intended to raise a strong following. Hagen sinks the horde into the Rhine R. at a secret spot. Thirteen years later Kriemhild marries Etzel (Attila), King of the Huns, and goes to live at his court. Years later she lures Hagen, Gunther, and their followers to the court of Attila, and has them all killed. She herself is killed by a German hero who was horrified at the murder of the Burgundians. The hoard of the Nibelungs remains at the bottom of the Rhine; the secret of its location died with Hagen. See GERMAN LITERATURE: Middle High German Period.

NICAEA

NICAEA. 1. City of ancient Bithynia (q.v.), now İznik, Turkey, on the eastern shore of Lake Ascania. It was founded by Antigonos I, King of Macedonia (see *under* ANTIGONUS), and later flourished under the Romans. It is famous in ecclesiastical history for the two Councils of Nicaea; see *NICAEA, COUNCILS OF*. 2. Ancient name of the modern city of Nice (q.v.) in France.

NICAEA, COUNCILS OF, two ecumenical councils (see *COUNCIL*) of the Christian Church, held at Nicaea (now İznik, Turkey), a city of ancient Bithynia, in Asia Minor.

First Council of Nicaea. Held in 325, the first of all ecumenical councils, was convened by Constantine I (q.v.), Emperor of Rome, to settle the Arian dispute (see *ARIUS*) concerning the nature of Jesus Christ (q.v.); see *CHRISTOLOGY*. Of the 1800 bishops in the Roman Empire, 318 attended the council. The Nicene Creed (q.v.), which defined the Son as consubstantial with the Father, was adopted as the official position of the Church regarding the divinity of Christ; see *TRINITY*. The council also fixed the celebration of Easter on the Sunday after the Jewish Pesach (q.v.) and granted to the bishop of Alexandria authority in the East; this authority was after the fashion of Rome's quasi-patriarchal authority, which was not, as sometimes erroneously stated, the same authority as that of the pope. In this granting of authority lay the origin of the patriarchates throughout the Church.

Second Council of Nicaea. Held in 787, the second of the councils at Nicaea was the seventh ecumenical council. It was convened by Irene (q.v.), Empress of the East, and attended by 350 bishops, most of whom were Byzantine. In spite of strong objections by the iconoclasts (see *ICONOCLASM*), the council validated the veneration of images and ordered their restoration in churches throughout the Roman Empire. See *BYZANTINE EMPIRE*; *IMAGE WORSHIP*.

NICARAGUA, largest republic of Central America, bounded on the n. by Honduras, on the e. by the Caribbean Sea, on the s. by Costa Rica, and on the w. by the Pacific Ocean. The country extends between about lat. 10°45' N. and lat. 15°10' N. and long. 83°15' W. and long. 87°47' W. The total area of Nicaragua is 57,143 sq.mi., comprising 54,269 sq.mi. of land and more than 2800 sq.mi. of water.

THE LAND

The Nicaraguan highlands, with a mean elevation of about 2000 ft., cross Nicaragua from the n.w. to the s.e. Several mountain ranges, the highest of which, the Cordillera Isabelia, reaches an elevation of 5413 ft. at Saslaya, cut the highlands from e. to w. In the w. is a great

basin, or depression, which contains two great lakes, Nicaragua (q.v.), the largest in Central America, and Managua. The two are connected by the Tipitapa R. A chain of volcanoes, which frequently cause earthquakes, rises between the lakes and the Pacific coast. In the e. the Caribbean coastal plain known as the Mosquito Coast extends some 45 mi. inland and is partly overgrown with jungle. The four principal rivers, the San Juan, Coco, Río Grande, and Escondido, empty into the Caribbean.

Climate. The coastal regions have a tropical climate with a mean average temperature of 78° F. In the higher altitudes in the interior the temperature varies between 60° F. and 80° F. The rainy season extends from May to December, and along the Caribbean coast the annual rainfall averages 150 in.

Natural Resources. The natural resources are primarily agricultural. Deposits of volcanic material have enriched the soil, which is extremely fertile. About 70 percent of the land is covered with forests. The country has large deposits of gold and copper.

Plants and Animals. The vegetation of Nicaragua is of a tropical and subtropical nature. Dense rain forests are found along the Caribbean coast and on the e. slopes of the highlands. Such trees as oak, pine, cedar, balsam, mahogany, and wild rubber, along with some fifty varieties of fruit trees, abound.

The wild animals include puma, deer, several species of monkeys, and alligators, as well as a variety of other reptiles. Parrots, hummingbirds, and wild turkeys are abundant.

Waterpower. The establishment of the Pacific Electrification Program and the Tuma-Viego project has greatly increased output of hydroelectric power, meeting most of the power requirements of the country.

THE PEOPLE

About 70 percent of the population is mestizo (people of mixed Spanish and Indian blood), 17 percent is European, and the remainder is Indian or Negro. The population of Nicaragua (official census 1971) was 1,911,543. The United Nations estimated the overall population density at about 39 persons per sq.mi. in 1970. Approximately 70 percent of the population is concentrated in the w. part of the country, and about 40 percent is urban.

Political Divisions and Principal Cities. The country is divided into sixteen departments and one national district. Managua (q.v.) with a population (census 1971) of 398,514 is the capital and commercial center. León (61,649) is an important religious and cultural center. Granada

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Cities and Towns

Acopya	B 3
Alamkamba	B 10 3
Andrés	C 1
Barra de Río Grande	C 1 2
Bilwaskama	C 1 2
Bluefields	C 1 2
Boaco	B 10
Bocay	B 2
Bonanza	B 2
Bragman's Bluff (Puerto Cabezas)	C 1
Cabo Gracias a Dios	B 2
Camopa	B 2
Chichigalpa	A 2
Chinandega	A 2
Ciudad Darío	B 2
Comapa	A 2
Condesa	A 2
Corinto	A 2
Cuicuina	B 2
Cuyo Tigni	C 1
Diriamba	A 3
El Gallo	B 2
El Jicaral	A 2
El Limón	A 2
El Sauce	A 2
El Viejo	A 2
Esquipulas	B 2
Estelí	B 3
Granada	B 3
Greytown (San Juan del Norte)	C 3
Jalapa	A 2
Jinotepe	B 2
Jinotepe	A 3
Juigalpa	B 2
La Conquista	A 3
La Cruz	B 2
La Libertad	B 2
La Paz	B 2
La Paz	A 3
Laguna de Perlas	C 2
León	A 2
Managua (cap.)	A 2
Masatepe	A 3
Masaya	A 3
Matagalpa	B 2
Mateare	A 3
Morrito	B 3
Moyogalpa	B 3
May Muy	B 2
May Muy Viejo	B 2
Nagarote	A 2
Nandaimé	B 3
Ocotel	A 2
Palsagua	B 2
Playa Grande	A 2



Potea	B 2
Prinzapolka	C 2
Puerto Cabezas (Bragman's Bluff)	C 1
Quilal	B 2
Rama	B 2
Rivas	B 2
San Carlos	B 3
San Francisco	B 3
San Jorge	B 3
San Juan del Norte	C 3
(Greytown)	A 3
San Juan del Sur	B 3
San Miguelito	B 3
San Pedro	B 2
San Rafael del Norte	B 2
San Rafael del Sur	A 3
San Ramón	B 2
Santa Cruz	B 2
Santo Domingo	B 2

Santo Tomás	B 3
Suna	B 2
Somotillo	A 2
Somoto	A 2
Telpaneca	A 2
Terrabona	B 2
Teustepe	B 2
Tipitapa	B 2
Trinidad	A 2
Tunkí	B 2
Waspan	B 1
Yabalis	C 2

Physical Features

Caribbean (sea)	C 2
Coco (Sagovia or Wanka) (river)	B 1
Coseguine (point)	A 2
Dariense (mts.)	B 2
Dipilto (mts.)	A 2

Escondido (river)	C 2
Grande (river)	C 2
Great Corn (isl.)	B 2
Huapí (mts.)	B 2
Isabella (mts.)	B 2
Kukaleya (river)	C 2
Little Corn (isl.)	B 2
Managua (lake)	C 1
Miskitos (coys)	C 1
Monkey (point)	C 1
Mosquito Coast (reg.)	C 1
Nicaragua (lake)	B 3
Omotepe (isl.)	A 3
Perlas (lagoon)	A 3
Salinas (bay)	B 3
San Juan (river)	B 3
Solentiname (isl.)	C 1
Tuma (river)	B 1
Waspuik (river)	B 1
Wawa (river)	B 1
Zapatera (isl.)	B 3

(40,500) is the terminus of the railway from the main port of entry, Corinto (10,000), on the Pacific coast.

Language and Religion. Spanish is the official language. Complete freedom of worship is insured by the constitution. About 75 percent of the people are Roman Catholic; the remainder are Protestant.

Education. Education is free and compulsory for children between the ages of seven and fourteen. The literacy rate is estimated at about 50 percent. Despite recent efforts to improve educational facilities, few students complete their secondary education. In the mid-1970's, Nicaragua had more than 2500 primary and secondary schools, with an estimated enroll-

ment of 350,000. The two universities, the National University in León and the Central American University in Managua, had an enrollment of 7680 students in the mid-1970's.

Culture. As in most Central American countries, the culture of Nicaragua reflects Spanish cultural patterns, dominant since the colonial period, combined with an ancient Indian heritage. Nicaraguans hold many colorful celebrations to commemorate local saints' days and ecclesiastical events. The marimba is extremely popular, and ancient musical instruments such as the *chirimía* (clarinet), *maracas* (rattle), and *zúl* (flute) are common in rural areas. Dances from colonial times survive today, as do fine examples of colonial architecture.



A street scene in Granada, one of the larger cities of Nicaragua, situated at the foot of Mombacho volcano, on Lake Nicaragua.

Photo Researchers

THE ECONOMY

The economy of Nicaragua has been expanding rapidly since 1961. The large increase in cotton exports provided the main thrust for this boom. The government has attempted in recent years, however, to diversify exports by promoting other crops and products. It has allocated more funds to internal improvements such as roads, power projects, and irrigation systems, and made credit more available to industrial and agricultural enterprises. In a recent year the national budget showed revenues of about \$98,000,000 and approximately the same amount in expenditures.

Agriculture. Agriculture employs approxi-

mately 70 percent of the labor force. The principal commercial crops are cotton and coffee. Other crops include corn, beans, rice, bananas, sugarcane, and yucca. Nicaragua is the leading cattle-raising country in Central America. In the early 1970's the country had about 2,550,000 dairy and beef cattle.

Forest and Fishing Industries. The country has about 10,000,000 acres of usable timber. Lumbering is carried on along the principal rivers that flow into the Caribbean.

Commercial fishing was taken over by the government in 1961, and by the late 1960's the value of annual exports of fish reached more than \$3,000,000. The principal commercial fish are shrimp and crayfish.

Mining and Manufacturing. In the mid-1960's gold production began to decrease, whereas

copper production steadily increased and is now the more economically valuable of the two. Silver is recovered as a by-product of gold refining. At present, large deposits of tungsten and iron ore are not exploited because of inadequate transportation facilities.

Some 13 percent of the population is engaged in industrial activity, chiefly in producing cement, chemicals, and consumer goods. The country has more than 400 coffee-processing plants and 25 sugar-refining mills, as well as textile mills that process domestic cotton.

Currency, Commerce, and Trade. The córdoba is the basic monetary unit (7 córdobas equal U.S.\$1; 1975). Annual exports in the mid-1970's were valued at about \$263,000,000. Cotton accounted for almost half the total value of exports, and coffee for about one fifth. Imports, including machinery, raw materials, and transport equipment, were valued at more than \$223,000,000.

Transportation and Communications. Nicaragua has about 3800 mi. of roads, 500 mi. of which are paved highways, serviceable all year. The 229-mile Nicaraguan stretch of the Inter-American Highway (q.v.) is now paved. The Roosevelt Highway, the first overland route linking the Pacific and Caribbean coasts of Nicaragua, was completed in 1968. The government-owned railway is 215 mi. long. International and internal air services are available. Radio service is provided by both government and commercial stations. One commercial television station is located in Managua.

Labor. In the mid-1970's the labor force numbered about 500,000. Of the 270 registered labor unions, about one third were classified as active. The leading unions, the Confederación General de Trabajo and the Confederación Nacional de Trabajadores, had 5000 members.

GOVERNMENT

The constitution of 1950 was abrogated by the congress in August, 1971. A 100-member constituent assembly convened in May, 1972, to draft a new constitution; see *History*, below.

Central Government. Under the abrogated constitution, executive power lies with the president, who is elected by direct popular vote for a term of four years and may not serve two consecutive terms. He is aided by three vice-presidents and an appointed cabinet.

HEALTH AND WELFARE. Health centers, local infirmaries, hospitals, and numerous services are administered by the Ministry of Public Health, the National Social Assistance Board, and the National Social Security Institute. Diseases resulting from poor sanitation and malnutrition re-

main the major causes of death; infant mortality exceeds 40 percent in rural areas. Social insurance is based on a 1956 law that provides workers with sickness, unemployment, disability, and maternity benefits.

Legislature. The congress, which dissolved itself in August, 1971 (see *History*, below), consists of a Senate of 16 members and a Chamber of Deputies of 42 members, elected to four-year terms.

Political Parties. The major parties are the ruling National Liberal Party and the Traditionalist Conservative Party, which serves as the official opposition. A second minority party is the Nicaraguan Conservative Party.

Local Government. The capital, Managua, and its vicinity constitute a national district, which is administered by an executive commission selected by the president. The sixteen departments are each directed by a governor appointed by the president.

Judiciary. The supreme court of justice, whose members are elected by congress, is the court of final appeal. Nicaragua has five courts of appeal and about 150 judges of first instance.

HISTORY

The coast of Nicaragua was sighted by the Italian-born explorer Christopher Columbus (q.v.) in 1502. The first Spanish expedition of conquest, under Gil González Dávila (about 1470–about 1528), arrived in 1522 and established several Spanish settlements. A second conquistador, Hernández Gonzalo de Córdoba (q.v.), founded Granada and León in 1524. Nicaragua was later incorporated into the captaincy-general of Guatemala. Colonial Nicaragua enjoyed comparative peace and prosperity, although freebooters, notably English navigators such as Sir Francis Drake (q.v.) and Sir Richard Hawkins (see under *HAWKINS*), continually raided and plundered the coastal settlements.

Independence. The first agitation for independence began at the beginning of the 19th century and Nicaragua declared itself independent of Spain in 1821. A year later Nicaragua became part of the short-lived Mexican empire of Agustín de Iturbide (q.v.) and in 1823, after Iturbide's downfall, joined the United Provinces of Central America (with Guatemala, Honduras, El Salvador, and Costa Rica).

Factional strife between the liberals, centered in the city of León, and the conservatives, centered in Granada, became characteristic of Nicaraguan politics. The Liberals fought to establish an independent nation and in 1838 declared Nicaragua an independent republic. Civil strife continued, however, and in 1855 William

NICARAGUA

Walker (q.v.), an American adventurer with a small band of followers, was engaged by the liberals to head their forces. He captured and sacked Granada in 1855, and in 1856 became president of Nicaragua. By seizing property belonging to a transport company controlled by Cornelius Vanderbilt (see *under VANDERBILT*), Walker incurred the latter's enmity. Vanderbilt backed the conservative opponents of Walker, who was forced to flee the country in 1857.

In 1893 a successful revolution brought the liberal leader José Santos Zelaya (1853–1919) to power. He remained president for the next seventeen years, ruling as a dictator.

After an abortive revolt against his government in 1912, Adolfo Díaz (1874–1964), elected provisional president in 1910, asked the United States for military aid to maintain order, and U.S. marines were landed. According to the Bryan-Chamorro Treaty of 1916, the U.S. paid \$3,000,000 to Nicaragua for the right to build a canal across the country from the Atlantic to the Pacific oceans, to lease the Great and Little Corn islands, and to establish a naval base in the Gulf de Fonseca. The agreement aroused protest in several Central American countries and resulted in anti-American guerrilla warfare in Nicaragua. A force of American marines remained in Nicaragua until 1925. Revolutions began when the marines left, and the American force was returned in 1926. An election was held under American supervision in 1928, and General José María Moncada (1871–1945), a liberal, was chosen president. The U.S. marines were finally withdrawn in 1933. Anastasio Somoza (1896–1956), commander of the national guard, was elected president in 1937. During the next twenty years, although not always president, he maintained virtual control of Nicaragua.

World War II and After. Nicaragua declared war on the Axis powers (q.v.) on Dec. 9, 1941. In June, 1945, it became a charter member of the United Nations. Nicaragua joined the Organiza-

tion of American States (q.v.) in 1948 and the Organization of Central American States, created to solve common Central American problems, in 1951. In 1956 Anastasio Somoza, who had resumed the presidency, was assassinated. He was succeeded by his son, Luis Somoza Debayle (1922–67), who first served out his father's term and was then elected in his own right. At the end of his tenure there was a period of four years during which close associates, rather than the Somozas themselves, held the presidency. Then, in 1967, Anastasio Somoza Debayle (1925–), younger son of the former dictator, was elected president. A military-minded autocrat, he soon faced opposition, which he repressed with the aid of the national guard.

In August, 1971, the legislature abrogated the constitution and dissolved itself. In elections to a constituent assembly in February, 1972, Somoza's Liberal Party won decisively. In May, Somoza stepped down to the post of chief of the armed forces; political control was assumed by a triumvirate of two Liberals and one Conservative, to hold office until elections scheduled for 1974. On Dec. 23, 1972, the city of Managua was virtually leveled by earthquake; about 6000 were killed and 20,000 injured. Martial law was declared, and Somoza in effect became chief executive again. He was formally elected president in 1974.

In early 1978 Pedro Joaquín Chamorro (1924–78), editor of the Managua newspaper *La Prensa* and long the most vocal of Somoza's opponents, was assassinated. Somoza was accused of complicity in the act, and a wave of violence ensued. The opposition to Somoza, which by September had turned into civil war, was spearheaded by the Sandinista National Liberation Front, a guerrilla group founded in 1962 and named for Augusto Sandino, a popular guerrilla leader killed in 1934 by Anastasio Somoza, Sr. Although the national guard temporarily crushed the insurrection, the Sandinistas later

Valuable mahogany is readied for movement downstream to a processing plant.
OFAR



resumed the conflict, and by April, 1979, a full-scale civil war was again ravaging the country. Trying to prevent another Communist regime in the hemisphere, the U.S. subsequently urged Somoza to resign in favor of a moderate coalition of his opponents. He finally stepped down on July 17, flying to exile in Miami, Fla., while the Sandinistas named a five-member junta to govern the country.

NICARAGUA, LAKE, lake in s.w. Nicaragua, about 100 mi. in length, and with a maximum width of about 45 mi. Roughly oval in shape and covering about 3100 sq.mi., it is the largest lake in Central America. The chief port is Granada. The lake contains the island Zapatera in the n., the Solentiname Islands in the s., and between them the island Ometepe, on which are the twin volcanoes Concepción and Madera.

The lake is part of the route of a proposed sea level canal connecting the Atlantic and Pacific oceans, north of the present Panama Canal (q.v.). **NICE**, city in France, and capital of Alpes-Maritimes Department, on the Mediterranean Sea, at the foot of the Maritime Alps, and at the western extremity of the French Riviera, 140 miles n.e. of Marseille. The city is built around a bay, and the old and new parts of Nice are separated by a small stream, the Paillon. Embankments and promenades, including the Promenade des Anglais, line the sea frontage, and a boulevard extends along the bay shore. The city and bay are protected from severe climatic changes by the mountains on the n. The dry, mild climate has made Nice a leading winter and summer resort. Nice is the site of Roman ruins and of the 17th-century monastery of Cimiez.

History. Probably founded by the Greeks as Nicaea about the 5th century B.C., Nice became a well-known trading colony in the ancient world. Taken by the Romans in 154 B.C., it subsequently changed rulers several times and suffered damage during many wars. In 1388 it acknowledged the supremacy of the House of Savoy, and from 1600 onward it was repeatedly taken by the French. In 1796 it was ceded to France by Sardinia, which was at that time ruled by the duke of Savoy. It was returned to Sardinia in 1814, and in 1860 was reincorporated into France after a plebiscite (q.v.). During World War II Nice was occupied by Italians in 1942 and by Germans from 1943 to 1945. Pop. (1968) 322,442.

NICENE CREED, in Christian theology, confession of faith; see CREEDS.

The first creed so named was adopted at the first Council of Nicaea (see NICAEA, COUNCILS OF) in 325 A.D. to settle a controversy concerning the

persons of the Trinity (q.v.). It was intended to cover debated questions as to the divinity of Christ (see CHRISTOLOGY; JESUS CHRIST), and it introduced the word *homoousian* (Gk., "of the same substance") to correct the error of the *homoiousian* (that is, "of similar substance") party. To it were added several clauses against Arianism; see ARIUS.

A later creed that is popularly known as the Nicene Creed is more properly called the Niceno-Constantinopolitan or Constantinopolitan Creed. It is based on a 4th-century creed that was made under the influence of the bishop of Jerusalem, Saint Cyril (q.v.), and edited in a Nicene sense. It is contained in the *Ancoratus* of Saint Epiphanius (q.v.) of Salamis and is traditionally but erroneously attributed to the first Council of Constantinople which met in 381; see CONSTANTINOPLE, COUNCILS OF. Of the 178 words in the original of this second "Nicene Creed", only 33 are positively taken from the creed of 325 A.D. The second creed is received as ecumenical by the Eastern and Roman communions and by the majority of the Reformed churches. This creed employs the singular form of the words used for expressing assent, "I believe", "I hope", "I confess". At the Council of Toledo (589) the Western Church added the *Filioque* (q.v.) clause and inserted the preposition "in" before the words "holy Catholic and Apostolic Church". In the *Book of Common Prayer* (q.v.) the preposition "in" is omitted, and by an accident the word "holy" does not appear; the phrase reads there "I believe one Catholic and Apostolic Church".

NICHIREN. See BUDDHISM: *Soka Gakkai*.

NICHOLAS, Saint (fl. 4th cent.), Christian prelate, patron saint of Russia, traditionally associated with Christmas (q.v.) celebrations. The accounts of his life are confused and historically unconfirmed. According to tradition he was a native of Patara, formerly a city in the ancient district of Lycia, Asia Minor (in what is now Turkey). He entered the nearby monastery of Sion and subsequently became archbishop of the metropolitan church in Myra, Lycia. He is said to have been present at the first Council of Nicaea; see NICAEA, COUNCILS OF. At the end of the 11th century some Italian merchants transported his remains from Myra to Bari, Italy, where his tomb is now a shrine. He is the patron saint of children, scholars, virgins, sailors, and merchants, and in the Middle Ages he was regarded by thieves as their patron saint, as well. Legend tells of his surreptitious gifts to the three daughters of a poor man, who, unable to give them dowries, was about to abandon them to a life of

NICHOLAS

sin. From this tale has grown the custom of secret giving on the Eve of Saint Nicholas. Because of the close proximity of dates, Christmas and Saint Nicholas' Day are now celebrated simultaneously in many countries. "Santa Claus", the designation for the jolly, bearded figure of folklore who is credited with bringing gifts to children on Christmas Eve, is an American corruption of the Dutch "San Nicolaas". His feast day is Dec. 6.

NICHOLAS, name of five popes and an antipope.

Saint Nicholas I, (about 819 to 822–67), known as NICHOLAS THE GREAT, pope from 858 to 867. He succeeded Benedict III (r. 855–58) and increased the power of the Holy See. He denied Lothair, King of Lorraine (d. 869), the right to divorce his wife and excommunicated the bishops who supported Lothair. His most significant act was the maintenance of the bishops' right of appeal to the Vatican against the authority of their superiors when he struggled with Hincmar (806–82), archbishop of Reims, on behalf of Rothad (d. 869), bishop of Soissons. His support of Saint Ignatius (799?–878), patriarch of Constantinople, against his powerful rival Photius (q.v.), particularly after the former's deposition in 858, resulted, in 867, in his own deposition by a synod (see COUNCIL) summoned by Photius; Nicholas died without knowing of this action and the ensuing schism of Eastern and Western Churches; see CHRISTIAN CHURCH, HISTORY OF THE. **Nicholas II** (980?–1061), original name GERARD OF BURGUNDY, pope from 1058 to 1061. He succeeded Antipope Benedict X (r. 1058–59), whom his supporters forced out, and directed Vatican policy under the reforming influence of Cardinal Archdeacon Hildebrand, later Pope Gregory VII (see under GREGORY). His pontificate is known for the progress made toward ending simony and concubinage among the clergy and for the Lateran Synod of 1059, which determined election procedure for popes.

Nicholas III (between 1210 and 1220–80), original name GIOVANNI GAETANO ORSINI, pope from 1277 to 1280. A member of a powerful Roman family, he was schooled in diplomacy and during his pontificate decreased civil interference with the papacy. He initiated a law that only Romans could achieve privilege and honor in Rome and thus rid the city of foreign domination. It was Nicholas who made the Vatican the permanent residence of the popes.

Nicholas IV (1227–92), original name GIROLAMO MASCI, pope from 1288 to 1292. He succeeded Pope Honorius IV (1210–87) after the pontificate had been vacant for ten months. In

1289 he promulgated a constitution granting the cardinals half of the income of the Holy See; he thereby established independence for the College of Cardinals, encouraging them to become involved in administering the Papal States (q.v.), the main source of papal income.

Nicholas V (d. 1333), original name PIETRO RAINALDUCCI, antipope from 1328 to 1330 in opposition to Pope John XXII (see under JOHN). He was installed by Louis IV (q.v.), Holy Roman Emperor, who had been excommunicated by Pope John. Nicholas, whose supporters were few, retained his insecure office for two years, during which time he also was excommunicated; then, having been promised a pardon, he confessed to the pope at Avignon (q.v.). Nicholas, although pardoned, was kept a prisoner in the papal palace until his death.

Nicholas V (1397–1455), original name TOMMASO PARENTUCELLI, pope from 1447 to 1455. A vigorous exponent of Renaissance art and learning, he rebuilt and beautified a Rome that was in physical decay and founded the Vatican Library, making it, through his devotion to the collection of manuscripts and the copying of Greek manuscripts into the far more accessible Latin, the largest library of its day. Among the important events of his pontificate were the resignation (1449) of the last antipope, Felix V (see under FELIX); the crowning (1452) of Frederick III (q.v.), the last Holy Roman emperor to be crowned in Saint Peter's Basilica (q.v.); and the fall (1453) of Constantinople (now Istanbul, Turkey) to the Ottoman Turks.

NICHOLAS I, (Russ. *Nicolai Pavlovich*) (1796–1855), Emperor of Russia (1825–55), third son of Emperor Paul I (1754–1801), born in Tsarskoye Selo (now Pushkin). Upon the death of his eldest brother, Emperor Alexander I (q.v.), in 1825 and the abdication of another brother because of a nonroyal marriage, Nicholas assumed the throne. His domestic policy was autocratic and his foreign policy aggressive. He waged war successfully against Persia (1826–28) and Turkey (1828–29); see RUSSO-TURKISH WARS. During 1830–31 Nicholas crushed Polish revolts against Russian authority and abolished the Polish constitution. In 1849 he aided Austria in the suppression of uprisings in Hungary. His schemes to add more Turkish territory to his domain led to the Russian defeat in the Crimean War (q.v.).

NICHOLAS II (Russ. *Nikolai Aleksandrovich*) (1868–1918), Emperor of Russia (1894–1917), eldest son of Emperor Alexander III (q.v.), born in Saint Petersburg (now Leningrad). He succeeded his father in 1894. Educated by a series of tutors, Nicholas was almost totally unpre-



Nicholas II and Empress Alexandra with their son Alexis Nikolaevich in 1913. Nicholas II and his family were executed in 1918.

Bettmann Archive

pared to rule and left most of the actual operation of the government to his ministers. In foreign affairs, he initiated the convening in 1899 of The Hague Conferences and the formation of the Permanent Court of Arbitration (qq.v.). But in 1904–05 his country was also involved in the disastrous Russo-Japanese War (q.v.), which, together with political unrest at home and a series of labor strikes, led to violent dissidence. The revolutionists forced the autocratic emperor to grant a constitution and an elected national assembly, the Duma (q.v.). After order was restored, however, Nicholas curbed the legislature's powers. Meanwhile, Russia under Nicholas II had made economic progress, some industries were established and railroads built.

In World War I (q.v.), the emperor took personal command of the Russian troops. He left his wife, the German-born Empress Alexandra Fedorovna (1872–1918), in virtual charge of the government. She was then under the influence of the unscrupulous monk Grigori Efimovich Rasputin (q.v.), whose reputed miraculous powers seemed to alleviate the hemophilic condition of her son, Alexis Nikolaevich (1904–18). Conditions in Russia declined rapidly because of heavy losses on the battlefield, and the economy and the military effort collapsed. During the resultant Russian Revolution (q.v.) of 1917, the emperor was forced to abdicate; and he and his family were imprisoned in Tobol'sk in Western Siberia. On July 16, 1918, the entire imperial family was executed by the Bolsheviks (see **BOLSHEVISM**).

See also **RUSSIA**: *The End of the Empire*: Nicholas II.

NICHOLAS (Russ. *Nikolai Nikolaevich*) (1856–1929), Russian grand duke and army officer, born in Saint Petersburg (now Leningrad), and educated for the military service. As a member of the Russian general staff he distinguished himself during the war with Turkey (1877–78). Becoming inspector general of the cavalry in 1895, he introduced training and organizational reforms in the cavalry schools. In 1905 he was appointed commander in chief of the St. Petersburg military district and made president of the newly created council for national defense. At the outbreak of World War I he was appointed commander in chief of the Russian army. The following year Nicholas II (q.v.), Emperor of Russia, personally took command of the Russian armies, and the grand duke was made commander in the Caucasus region. In 1917, after the Russian Revolution (q.v.), the grand duke went into exile in Paris, where he spent his remaining years.

NICHOLAS OF CUSA (1401–64), German prelate, philosopher, and mathematician, born in Kues (Lat. "Cusa"; now part of Bernkastel-Kues), and educated at the University of Padua. In 1448 he was created cardinal; two years later he became bishop of Brixen (now Bressanone, Italy), and papal legate for Germany. Nicholas was one of the earliest philosophers to break with the formalistic doctrines of Scholasticism; see **SCHOLASTICISM**: *Principal Characteristics*. He taught that God cannot be apprehended by the intellect, but only by direct mystical intuition; see **MYSTICISM**. As a mathematician, he anticipated the now universally accepted celestial theory of the Polish astronomer Nicolaus Copernicus (q.v.) that the earth rotates on its axis and revolves about the sun; see **ASTRONOMY**: *Medieval Astronomy*. He is the author of a number of philosophical and mathematical dissertations.

NICHOLSON, Ben (1894–), British painter, born in Denham, England. His father, the British artist Sir William Nicholson (1872–1949), was famous for his portraits, illustrations, and posters, executed mostly in woodcut (see **WOOD ENGRAVING**). The younger Nicholson, who studied painting in England, France, and Italy, had his first one-man show in London in 1922 and an important retrospective exhibition at the 1954 Biennale in Venice, Italy. His work progressed from impressionism through cubism (qq.v.) to a period in which he produced only white and grey reliefs, until he evolved his own style of delicately colored and purely designed abstractions, always based on real objects or landscapes. His works, which hang in many major galleries of the world, include "White Re-

NICKEL

lieff" (1935, Tate Gallery, London) and "November 1956 (Pistoia)" (1956, Art Institute of Chicago). In 1968 Nicholson was made a member of the Order of Merit.

NICKEL, metallic element with at.no. 28, at.wt. 58.71, b.p. about 2800° C. (5072° F.), m.p. 1452° C. (2645.6° F.), sp.gr. 8.90^{20°}, and symbol Ni. It was used as coinage in nickel-copper alloys for several thousand years, but was not recognized as an elemental substance until 1751 when the Swedish chemist Baron Axel Frederic Cronstedt (1722-65) isolated the metal from niccolite ore.

Occurrence and Production. Nickel occurs as a metal in meteors. Combined with other elements it occurs in minerals, such as garnierite, millerite, niccolite, pentlandite, and pyrrhotite; the last two minerals are the principal ores of nickel. Most of the world supply of nickel is mined in Canada; a rich deposit of nickel was discovered in 1957 in northern Québec. New Caledonia, the Soviet Union, and Australia are next in importance as nickel producers. World production of nickel in the early 1970's totaled about 700,000 tons annually. The United States has no large deposits of nickel; about 16,000 tons are produced annually, part of which is a by-product of copper refining. Most of the nickel used in the U.S. is imported; about 140,000 tons were imported in a recent year.

Nickel ores usually contain impurities, chief among which is copper. Sulfide ores, such as pentlandite and nickelififerous pyrrhotite, are usually smelted in a blast furnace and shipped in the form of a matte of copper and nickel sulfide to refineries, where the nickel is removed by various processes. In the electrolytic process (see ELECTROCHEMISTRY), the nickel is deposited in pure metallic form after the copper has been preferentially removed by deposition at a different voltage and in a different electrolyte. In the Mond process copper is removed by dissolution in dilute sulfuric acid and the nickel residue is reduced to impure metallic nickel. Carbon monoxide is passed over the impure nickel, forming nickel carbonyl, Ni(CO)₄, a volatile gas. The nickel carbonyl is heated to 200° C. (392° F.) and decomposes, depositing pure metallic nickel.

Properties. Nickel is a silver-white, hard, malleable, ductile metal, capable of taking a high polish. It is magnetic below 345° C. (653° F.). It exists in five stable isotopic forms. Metallic nickel is not very active chemically. It does not oxidize upon exposure to air and does not tarnish. It is soluble in dilute nitric acid and becomes passive (nonreactive) in concentrated nitric acid; it does not react with alkalis.

Uses. Nickel is used as a protective and orna-

mental coating for metals, particularly iron and steel, which are susceptible to corrosion. The nickel plate is deposited by electrolysis from a nickel solution. Finely divided nickel absorbs seventeen times its own volume of hydrogen and is used as a catalyst in many processes including the hydrogenation (q.v.) of oils. The greatest amount of the metal is used in the form of alloys. Nickel imparts great strength and corrosion resistance to steel; nickel steel, containing about 2 to 4 percent nickel, is used in automobile parts, such as axles, crankshafts, gears, valves, and rods; in machine parts; and in armor plate. Some of the important nickel-containing alloys are German silver, Invar, Monel metal, Nichrome, and Permalloy. The nickel coins of currency are an alloy of 25 percent nickel and 75 percent copper.

Compounds. Nickel forms divalent (nickelous) and trivalent (nickelic) compounds. The important compounds are divalent. Most of the salts of nickel, such as nickel chloride, NiCl₂, nickel sulfate, NiSO₄, and nickel nitrate, Ni(NO₃)₂, are green or blue in color and are usually hydrated. Nickel ammonium sulfate, NiSO₄ • (NH₄)₂SO₄ • 6H₂O, is used for nickel electroplating solutions. Nickel compounds are often identified by adding an organic reagent, dimethylglyoxime, which reacts with nickel to form a red, flocculent precipitate.

NICKLAUS, Jack (William) (1940-), American professional golfer, born in Columbus, Ohio. He began playing golf at the age of ten, and at the age of sixteen won his first major tournament, the Ohio Open. His next important tournament victory was in 1959, when he won the U.S. amateur championship, a feat he repeated two years later. Between 1959 and 1961, when he turned professional, Nicklaus had won all but one of the thirty amateur matches in which he had competed. In 1972 he tied the record of the American golfer Bobby Jones (see JONES, ROBERT TYRE), having won thirteen major titles. Also in 1972, he became the top career money winner in golf. By 1978 Nicklaus had won two U.S. Amateurs, three U.S. Opens, five Masters, four Professional Golfers' Association (P.G.A.) titles, and three British Opens.

NICOBAR, group of nineteen islands, in the Indian Ocean, between the Bay of Bengal and the Andaman Sea, and forming with the Andaman Islands to the N. a centrally administered territory, called the Andaman and Nicobar Islands, of the Republic of India. The islands, formed by the peaks of a submerged mountain range, extend some 200 mi. in a N.W. to S.E. direction. Great Nicobar is the largest and most

southerly of the islands. The chief occupations are fishing, woodworking, and handicrafts, and the chief products are coconut, coffee, rice, and rubber. The Nicobar Islands were annexed by Great Britain in 1869. From 1942 to 1945, during World War II, the Nicobar Islands were held by the Japanese. Area of Nicobar Islands, 635 sq.mi. Pop. of Andaman and Nicobar islands (1971 est.) 115,090. See **ANDAMAN**.

NICOLLE, Charles Jean Henri (1866–1936), French physician and microbiologist, born in Rouen, and educated at the University of Rouen. In 1903, after practicing medicine and working at the Pasteur Institute in Paris under the Russian bacteriologist Élie Metchnikoff and the French bacteriologist Pierre Paul Émile Roux (q.v.), Nicolle was appointed director of the Pasteur Institute in Tunis. He subsequently served as a surgeon in the French army in Algeria, and in 1932 became professor of bacteriology at the Collège de France. In 1909 Nicolle demonstrated that the body louse is the chief vector of typhus (q.v.). His discovery made possible the prevention of typhus epidemics by eliminating lice. He was awarded the 1928 Nobel Prize in medicine and physiology.

NICOLLS, Richard (1624–72), first English governor of New York, born in Bedfordshire. During the Great Rebellion (q.v.) he commanded a cavalry troop in the Royalist forces, and after the defeat of Charles II (q.v.), King of England, followed the Stuarts (see **STUART**) into exile. After the restoration of the monarchy he was commissioned to take New Amsterdam from the Dutch. The town surrendered to Nicolls' forces on Sept. 8, 1664, and he governed the colony as deputy for James, Duke of York, later James II (q.v.), King of England, for four years. He adopted a policy of gradual transition from Dutch to English law and government, renamed the colony and town New York, and formulated the legal code known as the Duke's Laws, which remained in force from 1665 to 1683. Nicolls resigned his post in 1668 and returned to England. He was killed during a war with the Netherlands in the naval battle of Southwold Bay.

NICOMEDIA. See **IZMIT**.

NICOSIA, city and capital of Cyprus, 33 miles W. of the seaport of Famagusta, with which it is connected by rail. An international airport is located on the outskirts of Nicosia. The city is a center for trade in agricultural products, and textiles, leather goods, brandy, cigarettes, and pottery are manufactured. Pop. (1971 est.) 117,000.

NICOTIANA, genus of annual and perennial herbs and, more rarely, shrubs belonging to the

Nightshade family. The genus, which contains more than 100 species, is native to the Western Hemisphere; several species are widely cultivated in gardens in warm temperate regions of the world, both for ornament and as crop plants for commercial use. The genus was named after the 16th-century French diplomat Jean Nicot (1530?–1600), who introduced it into France. Nicotiana plants have sticky, hairy, bitter foliage and are poisonous; the leaves are large, simple, and alternate. The white, yellow, green, or violet flowers are borne in panicles or racemes; they have a large, tubular, five-cleft calyx, a large, funnel-shaped, five-lobed corolla from the interior of which a long tube arises, five stamens, and a solitary pistil. The flowers are usually closed during the day and open at night. The fruit is a two-celled, many-seeded capsule. The domestic tobacco, *N. tabacum*, is the most valuable nicotiana, having leaves that are used for tobacco and as a source of nicotine (q.v.).

NICOTINE, colorless, oily, liquid alkaloid, $C_{10}H_{14}N_2$, that constitutes the principal active chemical constituent of tobacco (q.v.). Nicotine turns brown on exposure to air and boils at 247° C. (477° F.) under a pressure of 745 mm. Partial decomposition occurs at this temperature. It is soluble in water and completely miscible in alcohol, ether, chloroform, and petroleum ether. Nicotine is used in agriculture as an insecticide (q.v.) and in chemistry as a source of nicotinic acid (see **VITAMIN: Niacin**), which is obtained by the oxidation of nicotine. Tobacco smokers absorb small amounts of nicotine from inhaled smoke, and they may feel certain physiological effects as a result. In small doses nicotine serves as a nerve stimulant, especially upon the autonomic nervous system (q.v.), promoting the flow of adrenaline and other internal secretions. In larger doses, nicotine paralyzes the autonomic nervous system by preventing the transmission of nerve impulses across the spaces between adjoining nerve cells. Still larger doses of nicotine may cause convulsions and death. The effects of nicotine upon the nervous system vary among individuals. Some persons are capable of inhaling nicotine in tobacco smoke without ill effect, but others experience nausea, giddiness, depression, and respiratory disturbances upon inhaling even a small amount of tobacco smoke. In certain individuals nicotine hastens the formation of gastric ulcers. Nicotine, but not its salts, is absorbed through mucus and the skin; thus spillage and breathing the vapors should be avoided.

NICOTINIC ACID. See **VITAMIN: Vitamin B Complex: Niacin**.

NICTHEROY

NICTHEROY. See NITERÔI.

NIDAROS. See TRONDHEIM.

NIDIFICATION. See NEST BUILDING.

NIEBUHR, two American Protestant theologians, who were brothers.

Reinhold Niebuhr (1892–1971), born in Wright City, Mo., and educated at Elmhurst College, Elmhurst, Ill.; Eden Theological Seminary, Webster Groves, Mo.; and Yale Divinity School.



Reinhold Niebuhr

Union Theological Seminary

In 1915 he was ordained in the ministry of the Evangelical Synod of North America (q.v.) and made pastor of the Bethel Evangelical Church of Detroit, Mich. He held that post until 1928, at which time he joined the faculty of the Union Theological Seminary, New York City (q.v.), where he taught for thirty years. At the time of his retirement (1960) he held a chair of ethics and theology; he also served as dean (1950–55) and vice president (1955–60). After retiring he continued at Union as a lecturer. An outstanding, although not a systematic, theologian, Niebuhr was notable primarily for his examination of the interrelationships between religion, man, and modern society. Outside the field of theology, he took a keen interest in trade-union and political affairs. He was an active member of the Socialist Party (q.v.) in the 1930's, waged a vigorous fight against isolationism and pacifism (q.v.) before and during World War II, and in 1944 helped to found the Liberal Party (q.v.) in New York State. He received the United States Presidential Medal of Freedom in 1964 and was made

a member of the American Academy of Arts and Letters (q.v.). Niebuhr indicated his overriding interest in what has been called theological anthropology, a concern with the nature of man as a contact point for religion and society, in such major works as *Moral Man and Immoral Society* (1932), *Interpretation of Christian Ethics* (1935), and *The Nature and Destiny of Man* (2 vol., 1941, 1943). A penetrating critic of society, he also published *Faith and History* (1949), *Christian Realism and Political Problems* (1953), *The Self and the Dramas of History* (1955), and *Structure of Nations and Empires* (1959). In addition he edited *Christianity and Society*, a quarterly; *The World Tomorrow*, a Socialist newspaper; and the biweekly periodical *Christianity and Crisis*.

H(elmuth) Richard Niebuhr (1894–1962), born in Wright City, Mo., and educated at Elmhurst College, Elmhurst, Ill.; Eden Theological Seminary, Webster Groves, Mo.; and Yale Divinity School. Ordained in the Evangelical Synod of North America, he served a pastorate for two years and then joined the faculty of Eden Theological Seminary in 1919. He served as president of Elmhurst College from 1924 to 1927. In 1931 he joined the faculty of Yale Divinity School, where he spent the rest of his teaching career; at retirement he was Sterling Professor of Theology and Christian Ethics. Unlike his brother Reinhold, he was noted for his technical expertness as a theologian. His major works, however, indicate his concern with questions that also claimed the attention of his brother. They examine the basis of denominationalism in the United States, the interrelationship between man and the culture within which he lives, and the role of Christian faith in the transformation of that culture. These books include *The Social Sources of Denominationalism* (1929), *The Meaning of Revelation* (1941), *Christ and Culture* (1951), *Radical Monotheism and Western Culture* (1960), and *The Responsible Self* (posthumous publication, 1963).

NIEBUHR, Barthold Georg (1776–1831), German historian and statesman, born in Copenhagen, Denmark, and educated at the University of Kiel in Germany. In 1799 he entered the Danish civil service and in 1806 resigned to accept a similar post from the Prussian government. He was made professor of history at the University of Berlin in 1810. From 1816 to 1823, Niebuhr was Prussian ambassador to the Vatican. In 1816 he uncovered in the Cathedral of Verona, the *Institutes of Gaius*, the first important work to be discovered that dealt with Roman private law. In 1820 he found and edited fragments of

the works of the Roman historian Livy and the Roman orator and philosopher Marcus Tullius Cicero (qq.v.). After 1823 he taught in Bonn. Niebuhr is the author of *Römische Geschichte* (3 vol., 1811–32; Eng. trans., *History of Rome, 1828–42*) and of many historical treatises. His works had a profound influence on the modern critical approach to the study of history.

NIEMEYER, Oscar (1907–), Brazilian architect, born in Rio de Janeiro. After he was graduated from the University of Brazil in 1935, Niemeyer worked with the French architect Le Corbusier (q.v.) on designs for the Brazilian Ministry of Education and Health building, which was completed in 1936. In 1941 Niemeyer received his first important commission in community designing, in a suburb of Belo Horizonte. Among the buildings he designed was the Church of Saint Francis, which was so radical in its structure that consecration was delayed until 1959, although the church was completed in 1943. The boldness and imagination that Niemeyer exhibited in the design of this church has characterized all his work and gained him an international reputation as one of the leading modern architects. Although highly varied, his work generally has an open, airy quality in which volumes and empty space are integrated in unusual patterns. Buildings held aloft by concrete or steel stilts are distinctive features of his designs. Niemeyer served on the board of design consultants to the United Nations. He was the chief designer of the government buildings in Brasília (q.v.), the capital of Brazil. In 1966 two of his designs were completed in France: the urban area of the town of Grasse and the Communist Party headquarters in Paris.

NIETZSCHE, Friedrich Wilhelm (1844–1900), German philosopher, born in Röcken, near Leipzig. He studied philology at the University of Bonn under the German classical philologist Friedrich Wilhelm Ritschl (1806–76). Nietzsche became professor of classical philology at the University of Basel in 1869.

Early Influences. Nietzsche knew the writings of the German philosopher Arthur Schopenhauer (q.v.), whose metaphysical doctrine of the supremacy of the will profoundly influenced his thinking. Another significant event in Nietzsche's life was his meeting, about 1870, with the German composer Richard Wagner (q.v.) at the latter's villa on the Lake of Lucerne, Switzerland. The two men agreed in their esthetic and artistic opinions, and for a time Nietzsche was an enthusiastic proponent of the Wagnerian music drama, the rationale of which he may be said to have expounded in his essay



Friedrich Wilhelm Nietzsche on his deathbed (from a charcoal drawing by the 19th-century German painter Hans Olde).
Bettmann Archive

Die Geburt der Tragödie aus dem Geiste der Musik ("The Birth of Tragedy from the Spirit of Music", 1872).

As Nietzsche gradually formulated his own distinctive philosophy, however, he began to doubt the doctrines of both Schopenhauer and Wagner, perceiving in the pessimism of the former a mystical negation of the dynamic life impulse, and in the voluptuous art of the latter a narcotic for an effete and decadent age. The process of Nietzsche's alienation from Wagner was climaxed about 1874 by a violent quarrel, and thereafter they were enemies. In 1889, after a period of sustained and intensive work during which he produced some of his most forceful writings, he suffered a mental collapse. He retired to his mother's home near Weimar and was cared for by his sister until he died.

Philosophical Work. Nietzsche's thought, culminating in the glorification of the *Übermensch* ("overman" or "superman"), and in the doctrine of the ruthless will to power, may be traced in his *Menschliches-Allzu Menschliches* ("Human, All Too Human", 2 vol., 1878–80); *Morgenröte* ("Dawn", 1881); *Die Fröhliche Wissenschaft* ("The Joyous Science", 1882); *Also Sprach Zarathustra* ("Thus Spake Zarathustra", 1883–84); *Jenseits von Gut und Böse* ("Beyond Good and Evil", 1886); *Zur Genealogie der Moral* ("On the Genealogy of Morality", 1887); *Der Fall Wagner* ("The Wagner Case", 1888); *Der Antichrist* ("The Antichrist", 1888); *Der Wille zur Macht* ("The Will to Power", 1888); and *Götzen-dämmerung* ("Twilight of the Idols", 1889).

Nietzsche's significance in philosophy consists in his attempt to establish a goal for life different from the goals prescribed by traditional ethical and religious systems. According to him the function of philosophy is not to interpret and appraise values but to create them. "The

real philosophers", he wrote in *The Will to Power*, "are commanders and lawgivers; they say: 'Thus *shall* it be!' They determine first the Whither and the Why of mankind, and thereby set aside the previous labor of all philosophical workers . . . ; they grasp at the future with a creative hand, and whatever is and was, becomes for them thereby a means, an instrument, and a hammer. Their 'knowing' is *creating*, their creating is a lawgiving, their will to truth is *Will to Power*". All life, for Nietzsche, is will to power. The established ideals of civilization he holds to be the ends that bold and masterful men have set for themselves; but the ideals that formed the appropriate goals of their own high nature have become exalted traditions for subsequent ages. Against these self-assertive supermen stand the weak, the mediocre, the timorous, and the sickly, who, realizing their incapacity for individual achievement on a heroic scale, band together and set up a standard of life glorifying humility, gentleness, patience, forgiveness and love, the traits that protect their own weakness and make for their common safety. These traits, Nietzsche maintains, are idealized as virtues, such virtues being the marks of a slave morality, which expresses the will to power of the inferior. In slave morality "good" and "evil" are reckoned from the viewpoint of the person or persons *affected* by an action; in the morality of the superman "good" and "evil" are reckoned from the viewpoint of the person who *effects* the action. In the latter morality, virtues are regarded as the qualities that give power to the *Übermensch*. The superman, however, is not altogether ruthless. In fact, he has a kind of love that is the overflow of his own power. This love, uncontrolled by law, he gives to his equals, and may even extend to his inferiors when they do not stand in his way.

According to Nietzsche, slave morality, with its glorification of mediocrity, is to be maintained and encouraged for the vast body of inferior men. It becomes disastrous only when those who are born to be masters permit themselves to be imposed upon by it and so forfeit their birthright of independence and absolute self-determination. Although the mature master is free and accountable to no one but himself, his freedom is attained only through the imposition of a stern discipline in his childhood and youth, this discipline being continued by himself in later years. He is thus hard not alone to others but also to himself. He keeps a strict check on his emotions, allowing himself no passionate outbreaks in small matters. His habitual mien is one of poise, self-containment, and aloofness.

Because the superman does not propagate supermen, Nietzsche stipulates a program of selective breeding to keep the master class constantly supplied; see EUGENICS.

Nietzsche's doctrines profoundly influenced the official philosophy and propaganda of National Socialism (q.v.) in Germany. The first complete English translation of Nietzsche's writings was published between 1909 and 1913.

NIGER, a country of W. Africa; see NIGER, REPUBLIC OF.

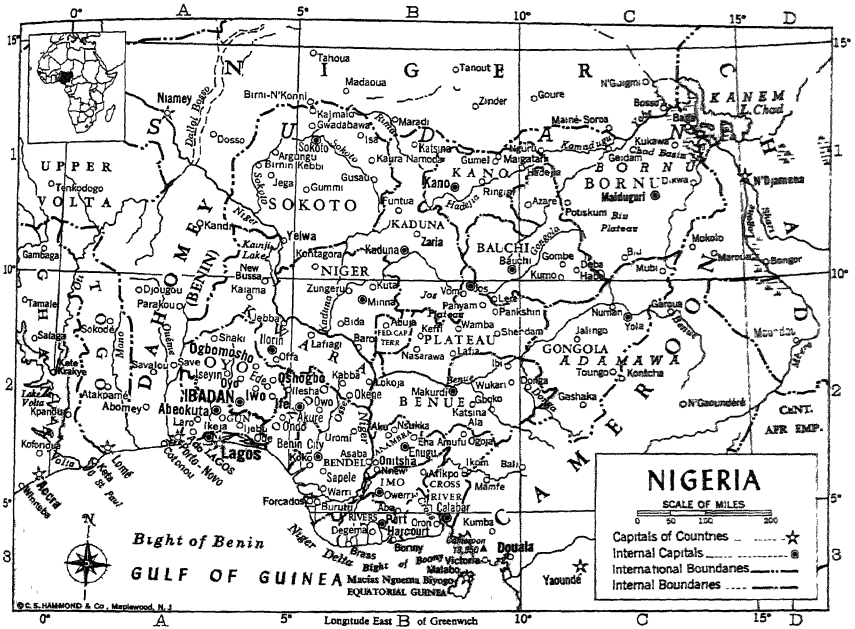
NIGER, river in western Africa, rising in N.E. Sierra Leone and flowing for about 2600 mi. through Guinea, Mali, Niger, and Nigeria, to the Gulf of Guinea. The Benue, which joins the Niger at Lokoja in Nigeria, is its chief tributary. The Niger delta (about 14,000 sq.mi. in area) is the largest in Africa; it has a coastline of nearly 120 mi. Port Harcourt is located on the delta.

NIGERIA, FEDERATION OF, republic within the Commonwealth of Nations, in W. Africa, bounded on the N. by the Republic of Niger, on the E. by Chad and Cameroon, on the S. by the Gulf of Guinea, and on the W. by Dahomey (Benin). The country extends between about lat. 4°30' N. and lat. 14°17' N. and long. 2°30' E. and long. 14°30' E. The area is about 356,669 sq.mi.

THE LAND

Nigeria is divided generally into four physical zones, which extend W. to E. from Dahomey to the mountains along the eastern border. Extending inland for from 10 to 60 mi. along the coast are mangrove forests and swamps interconnected by channels of the delta of the Niger River (q.v.) and other rivers flowing into the Gulf of Guinea. North of this belt is a broad zone of tropical rain forest. Then the land rises to a plateau and changes from open woodland to the grass savannas that cover most of northern Nigeria except the extreme N., where desert conditions prevail. Mountain ranges extend generally from N. to S. along the Nigeria-Cameroon border and reach a maximum elevation of 6700 ft. at Mt. Vogel. The Niger is the most important river and the Benue is its principal tributary. Except for part of Lake Chad (q.v.), in the extreme N.E., Nigeria has no large lakes.

Climate. The climate in the N. is tropical and arid, with temperatures rising to about 115° F. and rainfall averaging about 20 in. annually; the S. portion is tropical and humid, with temperatures averaging about 90° F. and rainfall about 120 in. annually. During the rainy season, from May to October, S.W. monsoon winds blow off the Gulf of Guinea. In the dry season, from November to April, a hot, dust-laden wind blows S. from the Sahara (q.v.).



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Gongola	C 2	Brass	B 3	Lagos (cap.)	A 2
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Kaduna (riv.)	A 1
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Niger (riv.)	B 2
Sokoto (riv.)	B 1

Natural Resources. Nigeria has rich mineral resources, which include petroleum, coal, tin, columbite, gold, iron, lead, silver, and tungsten. More than half the area is forested. Nigeria, with a large waterpower potential, produces some 1,574,000,000 kw hours annually.

Plants and Animals. Along the coast the swamps and mangrove jungles are populated by the hippopotamus, rhinoceros, crocodile, and many species of monkey, parrot, and snake. The

oil palm, the wild rubber plant, and the mahogany, ebony, and other hardwood trees are the dominant species of the adjoining rain-forest region. Farther N, in the savannah grasslands, locust, shea, and tamarind trees are found. Animals of the forest region and savannahs include the buffalo, gazelle, elephant, and gorilla. In the arid N regions shrubs, sparse patches of grass, and acacia and mimosa trees form the habitat for giraffes, lions, hyenas, and antelopes.

NIGERIA, FEDERATION OF

THE PEOPLE

The indigenous population of Nigeria consists primarily of Africans belonging to four principal tribes: the Yoruba (q.v.) in the w. and central areas, the Hausa and the Fula (qq.v.) in the n., and the Ibo in the e. A large number of smaller tribes add to the variety of customs and languages of the country, giving it a heterogeneous character. Nigeria is primarily a rural society.

Population. The population of Nigeria (census 1973) was 79,760,000; United Nations estimated (1973) 59,610,000. The population density is about 200 per sq.mi. (1973 U.N. est.), but it is unevenly distributed, with concentrations in the coastal regions and along the Niger R.

Political Divisions. The federation is divided into twelve States: North-Western, North-Central, Kano, North-Eastern, Kwara, Benue-Plateau, Mid-Western, Western, Lagos, East-Central, South-Eastern, and Rivers. The last three States formerly comprised the Eastern Region, which, in May, 1967, seceded from the federation and declared itself the independent Republic of Biafra; it was reincorporated into the federation on Jan. 15, 1970 (see *History*, below).

Principal Cities. Lagos, the federal capital and economic and commercial center, is the largest city (1971 est. pop. 900,969). Other important cities include Ibadan (758,322), Ogbomoso (386,650), and Port Harcourt (217,043).

Religion. Religious beliefs and practices vary widely from tribe to tribe; ancestor worship is common among the southern tribes. Adherents of tribal and family cults number approximately 10,000,000. Muslims, mostly in the n. and w.,

number about 16,000,000, and Christians of all denominations about 10,000,000.

Language. English is the official language, and Hausa, Yoruba, and Ibo are widely spoken. About 250 languages and dialects are used in Nigeria. See **AFRICAN LANGUAGES**.

Education. Education is the responsibility of the local governments, except in Lagos, where it is the responsibility of the federal government. Education is free for all children between the ages of six and twelve in the Western and Lagos States. An acute shortage of schools exists at the secondary level. Illiteracy rates range from 43 percent in Lagos to more than 85 percent in the n. States.

ELEMENTARY AND SECONDARY SCHOOLS. In the early 1970's about 15,000 primary schools with 100,000 teachers were attended by more than 3,500,000 pupils, and secondary and technical schools numbering about 1400, with some 17,000 teachers, were attended by approximately 360,000 pupils. More than 30,000 persons were in training at teacher-training institutes.

UNIVERSITIES AND COLLEGES. Nigeria has six universities providing education for some 20,000 students. In addition, many Nigerians study at universities abroad.

Culture. The tribes of s. Nigeria have a long and rich tradition in art and literature. This is particularly true of the Ibo and Yoruba peoples. Masterpieces of Yoruba portrait sculpture in bronze and terra-cotta dating from as early as the 12th century have been discovered at Ife in s.w. Nigeria. Yoruba poetry, inspired by religious tradition, is now being written by Yoruba and European scholars, and a quarterly magazine of new poetry is published in Ibadan.

Ibo artists create strikingly original wood

The streets of Lagos, the modern capital city and chief port of Nigeria, are congested with automobiles, bicycles, and pedestrians.

United Nations





In the inland plateau of Nigeria, round, thatched structures are used to store grain. British Information Services

carvings used for religious and decorative purposes, and their painted masks of ebony and other hard woods have long been world-famous. A more recent development is the use of concrete in the making of impressive funerary monuments. In the late 1960's clothing inspired by Nigerian tribal designs became popular among young people in the United States.

See AFRICAN ART; AFRICAN LITERATURE.

LIBRARIES AND MUSEUMS. The principal university library is located at Ibadan, and Lagos has a municipal library as well as several special libraries. The federal government maintains the Central Library at Enugu. Museums are under the jurisdiction of the antiquities service and include the National Museum at Lagos, which contains Nigerian statuary and carvings; the Ife Museum, which contains several bronze and terra-cotta heads; and the Jos Museum in Benue-Plateau State, which has a school for museum technicians.

THE ECONOMY

The Nigerian economy is primarily agrarian, although the industrial sector has expanded greatly since independence, aided in part by special tax incentives and investment guarantees offered by the government to foreign investors. The economy of Nigeria declined during the civil war of 1967 to 1970. With the return of peace, however, the annual output of the country began to return to more normal levels. The government's budget estimates in a recent year showed revenues of about \$1,375,000,000 and expenditures of \$635,000,000.

Agriculture. Agriculture is the basis of the economy and provides some 65 percent of the exports of Nigeria. Annual production figures in

NIGERIA, FEDERATION OF

the early 1970's included cocoa (300,000 tons), peanuts (780,000 tons), cotton (91,000 tons), palm oil (488,000 tons), and palm kernels (305,000 tons). Livestock raising is also important, principally for hides; cattle numbered about 11,500,000, and sheep, 8,000,000.

Forestry. The forests of Nigeria are an important segment of the economy, providing major export commodities. Among the species of timber are obeche wawa, abura, African mahogany, agba, sepele, and African walnut. In the early 1970's total forest production amounted to more than 2,000,000,000 cu. ft. of roundwood timber annually.

Mining. Mining industries are of growing importance to Nigeria, which is one of the leading tin producers in the world. Large oil reserves, located mainly in the ϵ , are being exploited. In addition to oil and tin, the principal mineral resources are coal, columbite, gold, iron ore, limestone, lead, and zinc. Annual production in the early 1970's included about 194,000 tons of coal, 7000 tons of tin, and 76,000,000 tons of petroleum.

Manufacturing. Industry is diversified, with present emphasis on processing consumer goods. Industrial production includes soap, cigarettes, beer, margarine, peanut oil, metal containers, plywood, textiles, ceramic products, and cement.

Currency and Banking. In 1972 Nigeria adopted a decimal system of currency. The unit of currency is the naira, consisting of 100 kobo (1 naira equals U.S.\$3.11; 1973). Currency is issued by the Central Bank of Nigeria. Two other Nigerian banks and several foreign banks operate in the country.

Fula tribeswoman in a marketplace of northern Nigeria. The Fula tribe is Islamic and animist and is one of the major tribes of the country. United Nations





Children studying the Koran at an outdoor school in Lagos, Nigeria. Development of educational facilities is high on the priority list of the Nigerian government.

United Nations

Commerce and Trade. In the early 1970's Nigerian exports totaled some \$1,811,000,000 annually, while imports were valued at about \$1,510,000,000. Among principal export items are tin and petroleum products, hides and skins, timber, and agricultural products. Principal imports include steel used in construction, cotton piece goods, motor vehicles, jute bags, and fish.

Transportation. Nigeria has more than 50,000 mi. of main and subsidiary roads, of which some 10,000 are surfaced. Railways totaling about 2000 mi. of line connect the major cities. Internal air services link Lagos and the main towns of the federation. Several international airlines also serve Nigeria.

Communications. Postal communications are provided by the federal government. Both the federal and regional governments have established commercial corporations for radio and television broadcasting, and in the early 1970's some 1,500,000 radios and 75,000 television sets were in use. Twenty daily newspapers are published, mainly in English; they had a combined circulation of about 320,000 in the early 1970's.

GOVERNMENT

Nigeria became independent in 1960 as a federation of three regions under a parliamentary form of federal government based on the British model. In 1963, the country proclaimed itself a federal republic, and a fourth region was added. In 1966, a national military government was established, which abolished the constitution and suspended the federal and regional legislatures. All political parties were subsequently banned.

Central Government. Legislative and executive power are vested in the supreme military council, composed of the State military governors, the military administrator of the federal territory, the heads of the army, navy, and air

force, the commander in chief of the armed forces, and the inspector general of police.

HEALTH AND WELFARE. Tropical diseases such as yaws, leprosy, sleeping sickness, and malaria are widespread in Nigeria but are gradually being eliminated by the application of improved preventive and remedial practices in recent years. The use of traveling dispensaries has contributed greatly to improvement in public health. Social welfare programs are largely the responsibility of tribal groups, but government-sponsored programs are increasing.

Local Government. Local government is the responsibility of native administrations, which are controlled by legislation enacted on a State basis. The State governments define the composition and duties of the native administrations and may dismiss or suspend them. The aim is to retain the traditional rulers within the framework of local government.

Judiciary. The judicial system includes high courts of justice in each State, which are courts of the first instance and hear appeals from the lower courts; magistrates' courts, which have jurisdiction in civil and criminal cases; and the federal supreme court, the final court of appeal, which also has original jurisdiction in disputes between a State and the federal government or between States. Customary courts have been retained throughout the federation to administer native law.

Defense. The strength of the federal army in 1970 was about 160,000 men, and of the navy, about 2000 men. The small air force is being built up with the assistance of equipment from the Soviet Union and Czechoslovakia.

HISTORY

Little is known about the history of Nigeria in ancient times, but archeologists have discov-

ered evidence of an ancient culture at Nok, southwest of the city of Jos in central Nigeria. The northern part of the present territory of Nigeria was the site of organized states known to Europeans through the expeditions of Portuguese sailors in the 15th century. The present region of Bornu (q.v.), southwest of Lake Chad, became a part of the Muslim empire of Kanem-Bornu about the 8th century. By about 1300 Bornu was a flourishing center of Islamic culture, rivaling Mali in the western Sudan region (Sudan is a geographical region that is usually considered to include northern and central Chad, northern and central parts of the present Republic of Sudan, and Ethiopia). Bornu reached its zenith as an independent kingdom under Idris Alawma (r. 1570-1610), who extended his rule over many of the eastern Hausa (q.v.) states; the western states fell under the sway of Songhai (q.v.). Following the breakup of the Bornu and Songhai empires in the late 16th century, the Hausa states regained their independence and continued to flourish until conquered by the Fula (q.v.), who moved into the area from the west in the early 19th century.

British Dominance. The Portuguese, British, and others established slave-trading stations in the Niger delta area in the 17th and 18th centuries. The interior was first penetrated by explorers seeking the source of the Niger R., notably the Scottish traveler Mungo Park (q.v.) in 1795-96 and the British explorers Richard Lemon Lander (1804-34) and John Lander (1807-39) in 1830-31. In the 19th century palm oil became so important an article of commerce that the delta region was known as oil rivers. A British consul was sent to Lagos, where British traders were firmly established, and in 1861 Great Britain took full possession of that area.

After the conclusion of several treaties with native chiefs the British Oil Rivers Protectorate was established in southern Nigeria. In 1886 the National African Company was granted a royal charter; under the charter the company governed the territory north of the protectorate, raising an armed constabulary and establishing government services. The name of the protectorate was changed in 1893 to the Niger Coast Protectorate. The kingdom of Benin in the southwest was added to the area in 1897, and, after further expansion in the southeast, the region became the Protectorate of Southern Nigeria in 1900. The charter of the Royal Niger Company was revoked in the same year, and the Protectorate of Northern Nigeria was established.

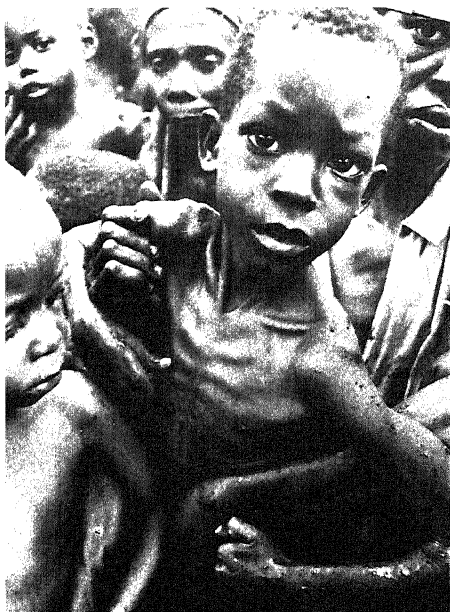
Neither of the two protectorates was under

full British control at the time of their establishment. The entire area of present Nigeria was, however, acknowledged to be British under agreements made between Great Britain, Germany, and France that divided much of Africa into so-called spheres of influence. British troops engaged in military conflicts with followers of Muslim emirs in the north and with Nigerian tribes that carried on the slave trade which had been prohibited by the British in 1807. The British conquest became complete in 1914, when the two administrations were merged as the Colony and Protectorate of Nigeria. For administrative purposes the country was divided into the Colony of Lagos and two groups of provinces in the protectorate, the Northern and Southern provinces.

Frederick Dealtry Lugard, 1st Baron Lugard (1858-1945), first governor of united Nigeria, instituted the system of indirect rule, whereby the local functions of government were for the most part delegated to the tribal chiefs or councils, which acted under the supervision and with the assistance and advice of British administrators. In 1922 the League of Nations mandate of Cameroons was added, administratively, to the protectorate. In the following year the Nigerian legislative council, which had limited legislative authority over the Colony of Lagos and the Southern provinces, was inaugurated; the Northern provinces remained under the jurisdiction of a British governor. The former League of Nations mandate of Cameroons became a United Nations trust territory in 1946 and continued to be under British administration.

Independence. Nigerian demands for self-government after World War II resulted in a series of short-lived constitutions. The first, in 1947, established provincial legislatures with limited native participation in the government. By succeeding constitutional changes, Nigeria was provided with a federal type of government, and the provinces were consolidated into three regions (Eastern, Western, and Northern), each with a measure of autonomy. In 1954 Nigeria became a federation and each region was given the option, dependent on certain safeguards for the federation, to assume a self-governing status. Internal self-government was granted to the Eastern and Western regions in 1957 and to the Northern Region in 1959.

On Oct. 1, 1960, Nigeria became an independent monarchy within the Commonwealth of Nations. On Oct. 7 it was admitted to membership in the U.N. The first prime minister, Alhaji Sir Abubakar Tafawa Balewa (1912-66), headed a coalition government representing the



Starving children were a casualty of the 1967-70 conflict between Nigeria and Biafra, which attempted to secede from the Nigerian federation. UPI

major parties of the Northern and Eastern regions. The governor-general was Nnamdi Azikiwe (1904–), who became president when Nigeria adopted a republican form of government on Oct. 1, 1963. Meanwhile, on Feb. 11–12, 1961, the northern section of the former British Cameroons voted to become a part of Nigeria.

From the early days of independence, tribal antagonisms and religious and political differences put serious strains on the unity of the federation. In 1962 a major political crisis developed in the Western Region, which was dominated by the Yoruba tribal group and its political party, called the Action Group. The Action Group, which had constituted the chief opposition bloc to the ruling coalition in the federal parliament, split in two during the year. Its parliamentary leader, who had expressed fear of a federal plot to break the party's power, was indicted for treason in 1963 and sentenced to ten years' imprisonment on Sept. 11. Meanwhile, as the result of a referendum held on July 13 in two districts of the Western Region where non-Yoruba peoples were a majority, a new Mid-West Region was formed.

In May, 1963, Nigeria was a founding member of the Organization of African Unity (q.v.).

Many voters in the Eastern, Western, and Mid-West regions boycotted the elections of 1964 in protest against the apportionment of

more than half the seats in the legislature to the Muslim-dominated Northern Region.

Civil War. Internal disorders, caused by Eastern resentment of Northern domination of the federal government, continued and culminated in a military coup in January, 1966. Sir Abubakar and two regional premiers were killed. A military government was established by the army commander, Major General Aguiyi-Ironsi (1925–66), who abolished the federal system. In July a counter coup, led by Northern officers, overthrew and killed Ironsi. His successor, Major General Yakubu Gowon (1934–), revived the federation. During this period many Ibo who were living outside their Eastern Region homeland were killed or returned as refugees.

Early in 1967 relations between the federal and Eastern Region governments continued to deteriorate. In May the federal government adopted constitutional proposals intended to split the region into three states, which would leave the Ibo without access to the sea and cut them off from the region's oil-rich areas. Finally, on May 30, the Eastern Region seceded and proclaimed itself the Republic of Biafra. When the federal government moved to crush what it called a rebellion, civil war broke out in July. The conflict lasted for two and a half years before Biafran resistance was overcome in 1970.

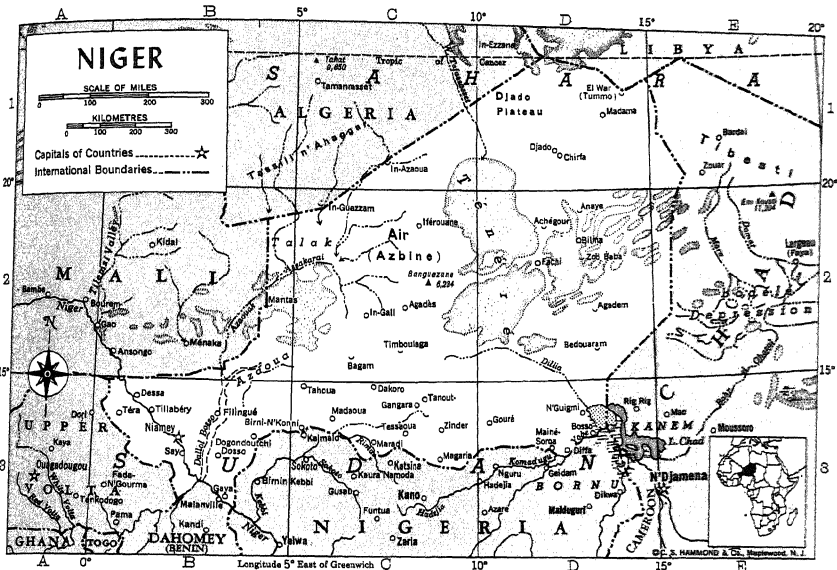
The 1970's. As life in the Eastern Region returned to normal, Nigeria enjoyed four years of rapid economic growth, fueled by expanding oil revenues. In 1975, however, a slowdown in oil production led to a decline in the growth rate and to renewed political instability. Gowon was ousted on July 29 in a bloodless coup led by Brigadier Murtala Ramat Muhammad (b. 1937). Muhammad was himself assassinated in an unsuccessful coup attempt on Feb. 13, 1976. His successor, Lieutenant General Olusegun Obasanjo, presided over the preparations for return to civilian rule, which culminated in the election of a senate and a new president, Shehu Shagari, in the summer of 1979.

NIGER, REPUBLIC OF (Fr., *République du Niger*), republic in w. Africa, bounded on the n. by Algeria and Libya, on the e. by Chad, on the s. by Nigeria and Dahomey (Benin), and on the w. by Upper Volta and Mali. It lies between lat. 12° N. and lat. 23°30' N. and long. 0°10' E. and long. 16° E. Area, 489,189 sq.mi.

THE LAND

The country may be divided into three zones, respectively, the northern, central, and southern. The n. zone, covering more than half of the total area of the republic, lies within the Sahara (q.v.) and, except in scattered oases, has little

NIGER, REPUBLIC OF



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Physical Features (cont'd)

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vegetation. In the zone is Bangueze (6234 ft.), the highest elevation in the country. The central zone is lightly wooded. The s. zone is a fertile, heavily forested area which benefits from adequate rainfall and, in the s.w., from the periodic overflow of the Niger River (q.v.), virtually the only river in the country. On the s.e., the nation borders on one of the major lakes of the continent, Lake Chad.

Climate. Rainfall, negligible in the n., increases to about 32 in. a year in the s. In the s. the rainy season extends from June to October. Temperatures range from a high of 113° F. in the n. to a low of 50° F. in the s.

Natural Resources. The main resource of the country is its grazing land and soil, which provide most of the national income and employment. Mineral resources include tin and large deposits of high-grade uranium ore.

Plants and Animals. The n. desert has little vegetation. In the s. are extensive savanna grasslands and, in the lowlands, a variety of trees in-

cluding baobab, kapok, and a species of mahogany. Animal life is abundant in the s., and includes elephant, buffalo, antelope, giraffe, and other savanna species.

Soil. The n. half of Niger is desert with sandy soils. Below this is a belt of brown soil with non-kaolinitic clays. The s. quarter of the country has ferruginous soil on clays or miscellaneous rock.

THE PEOPLE

The population is made up largely of Sudanese Negroes, chiefly the Hausa, who are subsistence farmers in the s. Of the remaining quarter of the population, most are Touareg and Fula, Hamitic peoples who follow a nomadic life.

Population. The population of Niger (census 1964) was 3,127,565; the United Nations estimated (1977) 4,860,000. Overall population density is less than 10 per sq. mi. (U.N. est. 1977), but the population is concentrated along the s. border.

Political Divisions and Principal Cities. Niger is divided into seven departments and thirty-

NIGER, REPUBLIC OF

two districts. Niamey, the capital, had a population of about 130,000 in the mid-1970's. Zinder (42,000), Maradi (40,000), and Tahoua (35,000) are the other principal towns.

Religion and Language. About 85 percent of the people are Muslims. Most of the remainder are animists, but there is a small Christian minority.

French is the official language, but Hausa, a tribal tongue, is the language of local trade. Other African languages, such as Fula, Tamachek, and Djerma, are also used extensively.

Education. Schooling is free, but not compulsory. A shortage of teachers and the wide dispersion of the population has meant that only a little more than 10 percent of the school-age children receive an education. In the mid-1970's, some 102,000 pupils attended primary schools, and almost 10,000 pupils were enrolled in secondary schools. Students in a technical school totaled about 400. Advanced training is given at the University of Niamey.

Culture. Islamic influences from North Africa have had a powerful effect on the tribal culture of Niger. During the colonial era European culture (particularly that of France) took hold among the upper class, with many local administrators receiving Western educations.

LIBRARIES AND MUSEUMS. All municipalities in Niger have state-run libraries, and several private organizations maintain libraries. The National Museum of Niger, in Niamey, includes both a library and a museum.

THE ECONOMY

Most of the people are subsistence farmers or pastoralists. In spite of the general aridity of the country, agriculture provides most of the national income. Industrial development is negligible. In a recent year the national budget showed a balance of revenues and expenditures, reported at about \$68,000,000 each.

Agriculture. Stock raising is the principal agricultural activity. In the mid-1970's the annual livestock population included about 2,800,000 cattle and about 1,800,000 sheep. Peanuts are the main export crop. Millet, sorghum, manioc (cassava), and rice are grown for local consumption. Annual production in the mid-1970's included millet (581,000 tons), manioc (295,000 tons), peanuts (50,000 tons), and sorghum (254,000 tons).

Fishing is conducted in Lake Chad and the Niger R. but the catch is consumed locally.

Mining and Manufacturing. In the west-central part of Niger, salt and natron are mined as well as tin. Large uranium deposits are being exploited in N. Niger. Reserves are estimated at

more than 23,000 tons, and approximately 1600 tons were produced in 1977. Industry is limited mainly to food processing and construction.

Currency and Banking. The unit of currency in Niger is the C.F.A. franc (230 C.F.A. francs equal U.S.\$1; 1978). It is issued by the Central Bank of the West African States. Several savings banks operate in the country.

Commerce and Trade. In the mid-1970's Niger annually exported goods amounting to some \$85,000,000, with uranium accounting for the bulk of the value. Imports totaled about \$99,000,000. About 75 percent of all exports went to France. Niger is an associate member of the Common Market and a member of the African-Malagasy-Mauritius Common Organization (OCAM).

Transportation and Communications. Niger has some 4800 mi. of motor roads, of which only about 1900 are serviceable throughout the year. An international airport serves Niamey, and the country has several other smaller airfields. The government is responsible for all postal service and telecommunications. Radio Niger serves about 150,000 radio users, and there are several daily and weekly papers.

GOVERNMENT

Until the military coup of April 15, 1974 (see *History*, below), Niger was governed under the 1960 constitution.

Central Government. The head of state was the president, who was elected for a five-year term. He was assisted by a council of ministers which he selected. Niger was essentially a one-party state. The Niger Progressive Party (Parti Progressiste Nigérien) controlled the government until it was suspended in 1974.

HEALTH AND WELFARE. Niger, in cooperation with world health services, is attempting to control such widespread diseases as smallpox, yaws, and helminthiasis. The government enforces the provisions of some labor and health legislation, but most welfare services are left to the complex, traditional tribal and family social system.

Legislature. Legislative authority was vested in the national assembly, which consisted of sixty deputies, elected by universal suffrage for five-year terms.

Judiciary. District courts and courts of conciliation are located throughout Niger. An appeal court and the supreme court are in Niamey, but the supreme court was suspended in 1974.

Defense. The armed forces of Niger totaled about 2000 in the mid-1970's. The gendarmerie consisted of about 1400 men, including 1000 national guardsmen. Niger has bilateral defense agreements with France.

HISTORY

During the Middle Ages the Niger region was on the central caravan route from northern Africa to the Hausa States (see NIGERIA, *FEDERATION OF: History*), and the Sudanese kingdoms of Mali and Songhai (q.v.). The area, therefore, was penetrated early by Muslim missionaries, and suffered from slave and caravan raiding.

The first Europeans to enter the area were the Scottish surgeon and explorer Mungo Park (q.v.) and the German explorers Heinrich Barth (1821–65) and Eduard Vogel (1829–56). The French settled the area about 1890. It was made a military territory in 1900, an autonomous territory in 1922, and an Overseas Territory in 1946. Niger was proclaimed an autonomous republic of The Community (q.v.) on Dec. 10, 1958, and, on Aug. 3, 1960, became fully independent.

In 1960 Hamani Diori (1916–) was elected president by the legislature. In 1964, the government crushed a rebellion aimed against the Diori regime, and in April, 1965, the president survived an assassination attempt. He was reelected in 1965 and 1970. In 1972 Niger became a founding member of the West African Economic Community (CEAO). Niger was one of six sub-Saharan nations affected by a five-year drought, which was broken by summer rains in 1973. Accused of corruption and mishandling of the famine, Diori was overthrown in a military coup d'état in April, 1974. Since the coup Niger has been ruled by a Supreme Military Council, headed by Lieutenant Colonel Seyni Kountché.

NIGHTHAWK, common name for either of two goatsuckers, in the genus *Chordeiles*, found throughout North America. Nighthawks somewhat resemble the closely related whippoorwill, *Caprimulgus vociferus*, and are about 10 in. long with a wingspread of almost 2 ft. They feed on insects which they usually catch on the wing at dusk. The common nighthawk, *Chordeiles minor*, is speckled in shades of black, gray, and tan, and has a broad white band across the throat and on each wing. The male has an additional white band traversing the tail. The cry of this bird is a high-pitched nasal note. It also produces a hollow, booming sound with its wings as it dives directly downward through the air in pursuit of food, thereby acquiring such popular names as "bullbat" and "mosquito hawk". The other species of nighthawk, *C. acutipennis*, is common in the southwestern United States. See GOATSUCKER; WHIPPOORWILL.

NIGHT HERON, common name for any of nine species of heron (q.v.) in the genera *Nycticorax*, *Nyctanassa*, and *Gorsachius*, differing

from most other herons in being active mostly at night, and in hunting, rather than waiting for, their food. The black-crowned night heron, *Nycticorax nycticorax*, is common throughout the warmer parts of the Western Hemisphere, and is also found in India, Africa, and southern Europe. The bird, which is about 2 ft. long, is black above, with gray wings and tail, and white below. The yellow-crowned night heron, or fish crane, *Nyctanassa violacea*, is a similar bird with a black and white face, and some yellow on the head, found from the coastal Atlantic and Gulf States to South America. The genus *Gorsachius* is represented by three species of heron in eastern Asia and one in central Africa.

NIGHTINGALE (OE. *nihtegale*, "nightsinger"), common name for any oscine bird in the genus *Luscinia* of the Thrush family, *Thurdidae*; see THRUSH. Nightingales are known for the exquisite nocturnal song of the male, which is especially fine during the breeding season. Native to the Old World, the birds are about 6 in. long, and both sexes are russet brown above, shading into a light, reddish chestnut on the rump and tail, and grayish white below. The bill, legs, and feet are brown. The common nightingale of western Europe is *L. megarhynchos*. The name "nightingale" is extended to a number of other songbirds, particularly the Japanese nightingale, *Leiothrix lutea*. This is a brownish bird with a yellow breast, a red bill, and red feet, that is kept as a cage bird in the United States.

NIGHTINGALE, Florence (1820–1910), British nurse, hospital reformer, and humanitarian, born in Florence, Italy. She was raised mostly in Derbyshire, England, and received a thorough classical education from her father. In 1849 she went abroad to study the European hospital system, and in 1850 she entered upon a course of training in nursing at the Institute of Saint Vincent de Paul in Alexandria, Egypt. She subsequently studied at the Institute for Protestant Deaconesses at Kaiserswerth, Germany. In 1853 she became superintendent of the Hospital for Invalid Gentlewomen in London.

After the Crimean War (q.v.) broke out, in 1854 Florence Nightingale, stirred by reports of the primitive sanitation methods and grossly inadequate nursing facilities at the large British barracks-hospital at Üsküdar (now part of İstanbul, Turkey), dispatched a letter to the British secretary of war, volunteering her services in the Crimea. At the same time, unaware of her action, the minister of war proposed that she assume direction of all nursing operations at the war front. Shortly thereafter she set out for Scutari accompanied by thirty-eight nurses. Under

NIGHTINGALE

her close supervision, efficient nursing departments were established at Üsküdar and later at Balaklava in the Crimea. Through her tireless exertions the mortality rate among the sick and wounded was greatly reduced.

At the close of the war in 1860, with a fund raised in tribute to her memorable services, she



Florence Nightingale

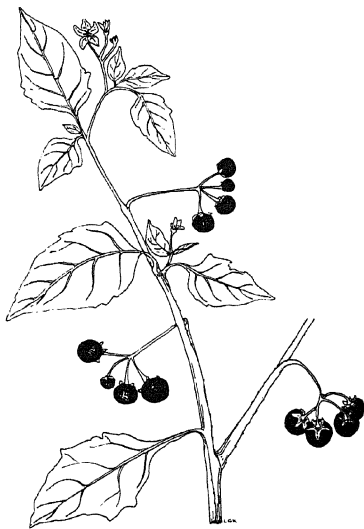
founded the Nightingale School and Home for Nurses at Saint Thomas' Hospital in London. The opening of this school marked the beginning of professional education in nursing.

Florence Nightingale's contribution to the evolution of nursing as a profession is invaluable. Before she undertook her reforms, nurses were largely untrained personnel who considered their job a menial chore. Through her efforts the stature of nursing was raised from an unskilled occupation to a medical profession with high standards of education and important responsibilities. She received many honors from foreign governments and in 1907 she became the first woman upon whom the British Order of Merit was conferred. In "Santa Filomena", a verse tribute by the American poet Henry Wadsworth Longfellow (q.v.), she was immortalized as "The Lady With the Lamp", an allusion to her customary manner of making the rounds of the sick wards during her service in the Crimea. In 1915 the Crimean Monument in Waterloo Place, London, was erected in her honor. Her writings include *Notes on Nursing* (1860), the first textbook for nurses, which was translated into many languages. Among her

other writings are *Notes on Hospitals* (1859) and *Notes on Nursing for the Labouring Classes* (1861).

NIGHTSHADE, common name for both a family of plants, Solanaceae, and the genus *Solanum* of mostly weedy plants. The Solanaceae family has about 75 genera and 2000 species and includes crop and garden plants such as potato, tomato, petunia, tobacco, and eggplant, as well as many poisonous plants. The poisonous nightshades contain alkaloids of three major types: tropane, found in belladonna, jimsonweed, and henbane (qq.v.); pyridine in tobacco (q.v.); and steroid in some members of the genus *Solanum*.

Included in the genus are such common weeds as horse nettle, *S. carolinense*, a spiny, perennial herb of south-central to eastern United States; European bittersweet (q.v.), *S. dulcamara*; silverleaf nightshade, *S. elaeagnifolium*, a whitish herb of prairies of the southwestern States and Mexico; black nightshade, *S. nigrum*, an annual, self-seeding herb found in disturbed soils of eastern and central North America; and buffalo bur, *S. rostratum*, a spiny weed of the Great Plains and eastward. Also in this genus are the common potato, *S. tuberosum*, eggplant, *S. melongena*, and Jerusalem cherry, *S. pseudo-capsicum*. The flowers of all have five sepals, five petals, five stamens, and a solitary pistil that in most species ripens into a berry. The flowers are white or pale violet, and the berry yellow in horse nettle; they are blue or



Black nightshade, *Solanum nigrum*

purple and red, respectively, in European bitter-sweet; violet or blue and yellow or orange, respectively, in silverleaf nightshade; and white and black, respectively, in black nightshade. Buffalo bur has yellow flowers and a spiny fruit or bur resulting from the persistence of the spiny calyx about the berry as it ripens.

The foliage and unripe fruit of most nightshades contain dangerous levels of a steroid alkaloid, solanine. The ripe berries are the least toxic part of these plants but may be deadly under some circumstances. Solanine is also found in potato sprouts and the green "sunburned" spots found on some potatoes. A toxic dose of any of these will usually result in symptoms of severe digestive upset. This may or may not be accompanied by various symptoms associated with the nervous system such as trembling, weakness, difficulty in breathing, or paralysis. Potato sprouts should be removed before using the tubers for food. Potato vines, sprouts, and rotten potatoes should not be used as forage for livestock.

J.M.K.

NIHILISM, Russian movement of the late 19th century, which sought social and political freedom for the individual through rejection of all forms of authority and traditional moral obligation. The word "nihilist" was popularized by the Russian novelist Ivan Sergeevich Turgenev (q.v.), who used it to describe the hero of his book *Fathers and Sons* (1862). Nihilists were characterized by skepticism, coarseness of speech and behavior, and a materialistic, utilitarian, and agnostic approach to life. Some nihilists joined revolutionary groups, such as the one that assassinated Alexander II (q.v.), Emperor of Russia, but many others were principally occupied with the development of their own personalities without interference from any outside source. The nihilists encountered bitter opposition from other Russian intellectuals, who claimed that nihilism would destroy all possibility of orderly and purposeful existence and was directly contrary to real human needs and desires. Nihilism is considered by modern scholars to have been a healthy, if exaggerated, reaction to the rigidity and backwardness of 19th-century Russian social and intellectual patterns. Its basic immaturity and lack of constructive orientation, however, caused the movement to die out by 1880. Outside of Russia, nihilism was used as a general term, erroneously applied to all violently radical groups. This usage eventually became standardized.

NIIGATA, city of Japan, and capital of Niigata Prefecture, on the island of Honshu, at the mouth of the Shinano R., 155 miles N.W. of

Tokyo. It is a leading port on the Sea of Japan, exporting oil, machinery, and textiles. It was opened to foreign trade in 1859. Pop. (1970) 384,000.

NIHAU, island of the State of Hawaii. The chief industries are livestock raising and the growing of rushes from which mats are pleated. The island is privately owned. The chief village is Puuwai. Area, 72 sq.mi.; pop. (1960) 254; (1970) 237.

NIJINSKY, Waslaw (1890–1950), Russian ballet dancer and choreographer, born in Kiev and educated at the Imperial Dancing Academy, Saint Petersburg (now Leningrad). He made his first public appearance in 1907 with the St. Petersburg Imperial Ballet. He later went to Paris and after 1909 was a member of the original Ballets Russes under the direction of the Russian ballet producer Sergei Pavlovich Diaghilev (q.v.). Nijinsky soon attained the rank of premier danseur. He was the first to portray the leading roles in *Le Spectre de la rose* ("The Specter of the Rose"); *Petrouchka*; *Scheherazade*; *Les Sylphides* ("The Sylphs"); *L'Après-midi d'un Faune* ("The Afternoon of a Faun"); and *Le Sacre du Printemps* ("The Rite of Spring"). His unconventional choreography for the two last-named ballets aroused lively comment and

Nijinsky performing in the ballet *Giselle*, in 1910.

Bettmann Archive



NIIMEGEN

many protests when the ballets were first performed. Ranking among the great male dancers of all time, Nijinsky had remarkable technical powers; his grands jetés, for example, created the illusion that he was suspended in midair. His spectacular career ended in 1918 when he became the victim of a mental illness from which he never fully recovered. See **BALLET: History: 20th Century**.

NIJMEGEN, city of the Netherlands, in Gelderland Province, on the Waal R., about 60 miles E. of Rotterdam. It is an inland shipping center and its industries include the manufacture of bricks, chemicals, leather goods, cigars, silverware, cutlery, and electrical equipment. Principal landmarks in Nijmegen include the 13th-century Groote Church; the Kam Museum, containing Roman antiquities; and the 16th-century Renaissance town hall. The city is the site of the Roman Catholic University of Nijmegen, founded in 1923. Nijmegen is built on the site of a Roman camp and for many years was a residence of the Carolingian (q.v.) emperors. It was a free imperial city and a member of the Hanseatic League (q.v.). In 1678–79 a peace treaty between the Netherlands, France, Spain, and the Holy Roman Empire was concluded here. In September, 1944, an unsuccessful air-borne attempt was made to rescue Allied forces trapped at Arnhem. Pop. (1972 est.) 150,229.

NIKE, in Greek mythology, goddess of victory, daughter of the Titan Pallas and the river Styx (q.v.). Nike fought on the side of the god Zeus in his battle against the Titans (qq.v.), and in Greek art she is sometimes represented as supported by the hands of Zeus and the goddess Athena (q.v.). She is otherwise represented as winged and carrying a wreath or palm of victory. The "Nike of Samothráki", or "Winged Victory", in the Louvre (q.v.) in Paris, is one of the finest pieces extant of Hellenistic sculpture; see GREEK ART AND ARCHITECTURE: *Hellenistic Period*.

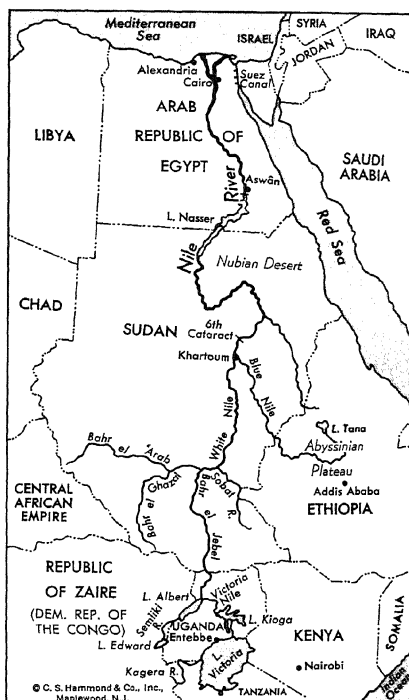
NIKOLAYEV, city of the Soviet Union, in the Ukrainian S.S.R., and capital of Nikolayev Oblast, at the confluence of the Bug and Ingul rivers, about 68 miles N.E. of Odessa. A leading port on the Black Sea and one of the most important shipbuilding centers in the Soviet Union, the city has an excellent harbor, which is kept open in the winter by icebreakers. The chief exports are cereal grains, flour, iron, and manganese ore. Industrial establishments engage in the manufacture of cast iron and agricultural machinery and in the processing of food products.

In ancient times a Greek settlement occupied the site of the present-day city. Nikolayev developed around a shipyard established about 1788.

During World War II the Germans occupied the city and destroyed the naval base there. Pop. (1970) 331,000.

NILE, river of Africa, and the longest river in the world. From its outlet in Lake Victoria in east-central Africa, it flows generally northward through Uganda, the Republic of the Sudan, and the Arab Republic of Egypt (formerly the United Arab Republic) to the Mediterranean Sea, for a distance of 3470 mi. From its remotest head-stream in the mountains of Tanzania, the river is 4145 mi. long. The river basin has an area of more than 1,000,000 sq.mi.

The source of the Nile is one of the upper branches of the Kagera R. in Tanzania. The Kagera follows the boundary of Rwanda northward, turns E. along the boundary of Uganda, and drains into Lake Victoria. On leaving Lake Victoria at the site of the now submerged Ripon Falls, the Nile rushes for 300 mi. between high rocky walls, over rapids and cataracts, at first n.w., then w., until it enters Lake Albert. The section between the two lakes is called the Victoria Nile. The river leaves the N. end of Lake Albert as the Albert Nile, flows through N. Uganda, and at the Sudan border becomes the Bahr el Jebel. At



its junction with the Bahr el Ghazal, the river becomes the Bahr el Abyad, or the White Nile. Various tributaries flow through the Bahr el Ghazal district. At Khartoum the White Nile is joined by the Blue Nile, or Bahr el Azraq. These are so named because of the color of the water. The Blue Nile, 950 mi. long, gathers its volume principally from Lake Tana, in the Ethiopian Highlands, in which region it is known as the Abbai. From Khartoum the Nile flows N.E. and 200 mi. below that city is joined by the Atbara R. It is the black sediment brought down by this river that settles in the Nile Delta, and makes it extraordinarily fertile. During its course from the confluence of the Atbara through the Nubian Desert, the great river makes two deep bends. Below Khartoum navigation is rendered dangerous by cataracts, the first occurring N. of Khartoum, the sixth near Aswân. The Nile enters the Mediterranean Sea by a delta that separates into two main channels, the Rosetta and the Damietta.

In 1858 the British explorer John Hanning Speke (q.v.) reached Lake Victoria, and in 1862 discovered Ripon Falls. Two years later the British explorer Sir Samuel White Baker (q.v.) discovered Lake Albert, and, from 1868 to 1871 the German explorer Georg August Schweinfurth (q.v.) explored the w. feeders of the White Nile. In 1875 the British-American explorer Sir Henry Morton Stanley (q.v.) sailed around Lake Victoria. In 1889 Stanley, in tracing the course of the Semliki R., discovered Lake Edward and the Ruwenzori range.

Providing storage water for cotton plantations in the Sudan, the Makwar Dam was built across the Blue Nile s. of Khartoum shortly after World War I. It is today called the Sennar Dam after the town near which it is located. Aswân Dam was heightened for a second time in 1936 and its storage capacity increased. In 1971 the Aswân High Dam (q.v.) was opened; it is one of the largest reservoirs and hydroelectric installations in the world. At Jebel Aulia, on the White Nile s. of Khartoum, another storage reservoir was provided in a dam built in 1937.

NILE, BATTLE OF THE, naval action fought on Aug. 1-2, 1798, during the Napoleonic Wars (q.v.), between the British and the French in Abu Qir Bay, 15 miles N.E. of Alexandria, Egypt. In 1798 a French fleet of seventeen ships under the command of Vice-Admiral François Paul Brueys d'Aigalliers (1753-98) had sailed from Toulon, France, with Napoléon Bonaparte, later Napoleon I (q.v.), Emperor of France, and the army with which he intended to conquer Egypt, preliminary to attacking the British in India. From

June to August, British Rear Admiral Horatio Nelson (q.v.) and his fleet of fourteen ships searched the central and eastern Mediterranean Sea for the French fleet, and on the afternoon of Aug. 1 found the enemy ships anchored in Abu Qir Bay.

Brueys stationed his vessels in a line near one shore of the bay. Expecting the British to fight as they came in from the sea, he ordered the guns on the seaward side of his ships prepared for action, neglecting those on the landward side. The battle began about sunset. Nelson, risking the shallows and the reefs near shore, maneuvered part of his fleet between the French ships and the land and kept part to seaward of the French, who were thus attacked on two sides simultaneously. In addition to being outmaneuvered, the French were short of men, many of their crews having gone to shore earlier in the day to obtain supplies of water. In a few hours all of the French vessels, except four that were captured or destroyed in later engagements, either surrendered or were destroyed; several of the British ships were badly damaged. The British casualties were about 200 killed and 700 wounded; the French lost more than 5000 killed wounded, or taken prisoner. The Battle of the Nile was one of the decisive engagements in naval history. Nelson's victory cut off Napoleon's line of communication with France, a circumstance that eventually caused him to abandon his expedition to the Middle East. The victory also gave Great Britain control of the entire Mediterranean Sea and was instrumental in inducing various European powers to join Great Britain in a new coalition (1799) against France.

NILES, city of Michigan, in Berrien Co., about 45 miles S.W. of Kalamazoo, and 12 miles N. of South Bend, Ind. Manufactures include building materials, paper products, furniture, and refrigeration equipment. In a farm and fruit area, the city is a shipping center. It was the site of a Jesuit Mission in 1690 and since then has been a British, Spanish, and United States fort. Niles was founded in 1822, incorporated as a village in 1835, and as a city in 1859. Pop. (1960) 13,842; (1970) 12,988.

NILES, city of Ohio, in Trumbull Co., on the Mahoning R., 5 miles S.E. of Warren. Manufactures include iron and steel, pottery and other clay products, and glass. It is the birthplace of William McKinley (q.v.), twenty-fifth President of the United States. The city was incorporated in 1804. Pop. (1960) 19,545; (1970) 21,581.

NILES, village of Illinois, in Cook Co., on the wooded North Branch of the Chicago R., adjoining Chicago on the N.W. and 15 mi. from the city

center. The Tam O'Shanter Country Club, site of championship golf tournaments, is situated here. The village was incorporated in 1899. Pop. (1960) 20,393; (1970) 31,432.

NILSSON, (Märta) Birgit (1918–), Swedish soprano, born near Malmö. She studied voice at the Royal Academy of Music, Stockholm, making her first public appearance there in 1946, and singing her first leading role in *Macbeth*, by the Italian composer Giuseppe Verdi (q.v.), in 1948. In 1951 Miss Nilsson began to sing outside Sweden, appearing in *Idomeneo*, by the Austrian composer Wolfgang Amadeus Mozart (q.v.), at the Glyndebourne Festival in England. She gained international fame for her roles in operas by the German composer Richard Wagner (q.v.) at the Bayreuth Festival in West Germany in 1954, and has since sung in the major opera houses of the world.

Miss Nilsson's American debut occurred in 1956 in the Hollywood Bowl, Los Angeles, in a concert with the Los Angeles Philharmonic Orchestra. Later that year she made her American operatic debut with the San Francisco Opera Company, when she sang Brünnhilde in *Die Walküre* by Wagner. Her debut at the Metropolitan Opera, New York City, in 1959 was as Isolde in Wagner's *Tristan und Isolde*.

Considered by some critics the foremost Wagnerian soprano of her time, Miss Nilsson also includes in her extensive repertoire works by Italian composer Giacomo Puccini and German composers Richard Strauss and Ludwig van Beethoven (qq.v.), as well as those of Verdi and Mozart.

NÎMES, city in France, capital of Gard Department, on a plain in the Cevennes region, about 60 miles N.W. of Marseille. A trade center for the silk, wine, and agricultural products of the surrounding area, the city also has distilleries, breweries, tanneries, foundries, and oil-processing plants and manufactures chemicals, agricultural machinery, apparel, food products, rugs, auto parts, furniture, and shoes. It is one of the outstanding sites of Roman ruins in France, containing a famous 1st-century arena, the Tour Magne (50 B.C.), a 2nd-century temple of Diana, the fountain of Nîmes, ancient city gates, the Maison Carrée (a Corinthian-style temple now used as a museum of antiquities), and other Roman relics. Of later date are the Cathedral of Saint-Castor, begun in the 11th century, an archaeological museum housed in a 17th-century Jesuit college, an 18th-century theater, and a fine-arts museum. The ancient Nemausus was the center of a Gallic tribe that surrendered to Rome in 121 B.C., after which it soon became an

important cultural center. Nîmes was a republic in the 8th century; the later viscounty passed to Toulouse and, in 1271, to France. A Protestant stronghold, the city was the scene of a massacre of Roman Catholics in 1567. It is the birthplace of the novelist Alphonse Daudet (see under DAUDET). The name of the city was formerly spelled Nismes. Pop. (1968) 123,292.

NIMITZ, Chester William (1885–1966), American naval officer, born in Fredericksburg, Texas, and educated at the United States Naval Academy at Annapolis, Md. During World War I he was chief of staff to the commander of the submarine force of the Atlantic Fleet. In 1938, after advancing through the ranks, he was appointed rear admiral. In December, 1941, after the Japanese attack on Pearl Harbor and the entry of the United States into World War II (q.v.), Nimitz was appointed commander in chief of the Pacific Fleet, with the rank of four-star admiral. He was advanced to the position of admiral of the fleet in 1944. Nimitz's accomplished planning of strategy, bold tactics, and brilliant use of his staff and forces were largely responsible for the successes of the United States Navy in the Pacific theater during the war. He was chief of naval operations from December, 1945, to December, 1947, when he retired. In 1949 he headed the United Nations commission for India and Pakistan.

NINEVEH, capital of the ancient kingdom of Assyria (q.v.), in the valley of the Tigris R., opposite the present-day city of Mosul, Iraq. The original capital was Ashur, but it was supplanted, first by Calah and then by Nineveh and Dur Sharrukin. When Nineveh fell in 612 B.C., the whole Assyrian Empire, essentially a military power, perished with it. It was not until the excavations of the French archeologist Paul Émile Botta (q.v.) in 1843 that the remains first of Dur Sharrukin, then of Nineveh, were rediscovered. The sculptured monuments of its ancient kings and the relics of its clay-inscribed library yielded their secrets to the investigations of scholars, and the life and history of the ancient kingdom of Assyria became known with almost as much certainty as those of Greece and Rome.

NINGHSIEN formerly NINGPO, city and port of the People's Republic of China, in Chekiang Province, on the Yung R., 15 mi. from the East China Sea, and 100 miles S. of Shanghai. It is one of the leading fishing ports in China, as well as a commercial and industrial center with ironworks, steelworks, textile mills, machine shops, and furniture factories. It is a cultural and religious center and has several temples and colleges. Pop. (1970 est.) 350,000.

NIÖBE, in Greek mythology, daughter of Tantalus (q.v.) and Queen of Thebes. Her husband, King Amphion, was a son of the god Zeus (q.v.) and a great musician. When he and his twin brother Zethus built the high wall around Thebes, Amphion played the lyre so beautifully that the stones of the field followed him to the city. Niobe bore him seven handsome sons and seven beautiful daughters. Although she was happy, Niobe exhibited the same arrogance toward the gods that her father had shown; see **ATREUS**, **HOUSE OF**. She commanded the people of Thebes to worship her instead of the goddess Leto (q.v.), who had only two children, while she had fourteen. The gods heard her words on far-off Mt. Olympus and resolved to punish her. Leto's children, Apollo, the archer-god, and Artemis (qq.v.), goddess of the hunt, fired their arrows with deadly aim, killing all of Niobe's children. The grief-stricken Niobe was turned into a stone that was forever wet with her tears.

NIÖBIUM or **CÖLUMBIIUM**, metallic element with at.no. 41, at.wt. 92.91, b.p. over 4700° C. (8492° F.), m.p. 2467° C. (4472.6° F.), sp.gr. 8.572, and symbol Nb. This rare, gray, lustrous, ductile, and malleable metal was discovered in 1801 by the British chemist Charles Hatchett (1765-1847). It occurs, associated with the similar element tantalum (q.v.), in various minerals, the most important of which is called columbite (q.v.) or tantalite, depending on which of the two elements predominates. Although niobium is found in many parts of the world, a large proportion of the world production comes from Nigeria and Zaire.

Niobium burns when heated in air, and combines with nitrogen, hydrogen, and the halogens. It resists the actions of most acids. Its principal use is as an alloying element in stainless steel, to which it lends additional corrosion resistance, particularly at high temperatures. Pure niobium has excellent characteristics as a construction material in nuclear-power plants.

NIPIGON, lake of central Ontario, Canada, near Thunder Bay. Studded with several large islands, the lake is about 115 km (70 mi.) long and has an area of 4848 sq.km (1872 sq.mi.). It is fed by numerous streams and is drained, in the s., by the Nipigon R.

NIRENBERG, Marshall W(arren) (1927-), American biochemist, born in New York City. He received a B.S. degree in 1948 and an M.S. degree in 1952, both in biology and both from the University of Florida in Gainesville. Nirenberg earned a PH.D. degree in biochemistry from the University of Michigan in 1957. He was a postdoctoral fellow of the American Cancer

Society, joining the National Institutes of Health in Bethesda, Md., in 1957 and remaining there to perform research in the genetic code (q.v.), protein synthesis, and nucleic acids (q.v.). In 1962 he became director of the biochemical genetics section of the National Heart Institute. Nirenberg is credited with experiments that made possible the solving of the genetic code. He shared the 1968 Nobel Prize in medicine and physiology with the American scientist Robert W(illiam) Holley and the Indian-born chemist Har Gobind Khorana (qq.v.) for their independent research in how certain genes determine the formation of certain enzymes.

NIRVANA, metaphysical concept central to Jainism, Buddhism, and some forms of Hinduism (qq.v.). The term denotes a state of enlightenment or omniscient peace, which results in deliverance from samsara, or transmigration (q.v.), the cycle of births and deaths through which the individual soul must pass. See also **MYSTICISM**.

NIŠ, city of Yugoslavia, in Serbia, on the Nišava R., about 130 miles s.e. of Belgrade. It is an important railway center with railway repair facilities, and also a leading industrial center, producing leather goods, tobacco products, and armaments.

The city, an important center in ancient Roman times, was the birthplace of the Roman emperor Constantine I (q.v.). It fell in succession to the Huns, Bulgars, Hungarians, Byzantines, Serbs, and Ottoman Turks and was almost constantly in Turkish possession from the 15th century until it was retaken by the Serbs in 1878.

Niš was a capital of Serbia until 1901. It was occupied by the Germans during World War II. Pop. (1971) 132,667.

NISHAPUR, town of Iran, in Khurasan Province, in a beautiful and fertile valley 45 miles w. of Meshed. Cotton, grains, and fruits are the most important products. The town was the birthplace, and contains the grave, of the Persian poet Omar Khayyām (q.v.). Pop. (1972 est.) 40,000.

NISHINOMIYA, city of Japan, in Hyogo Prefecture, on the island of Honshu, on Osaka Bay, 8 miles n.w. of Osaka. A rail junction, the city is a major sake-brewing center and also produces vegetable oils. It is the site of the Hirota Shrine, Kobe Women's College, Kansei Gakuin University, a baseball stadium, and a racecourse. Pop. (1970) 377,000.

NITER. See **SALT PETER**.

NITERÓI, formerly NICTHEROY, town in Brazil, in the State of Rio de Janeiro, on Guanabara Bay, 5 miles e. of the city of Rio de Janeiro, of

NITRATES

which it is a residential suburb. Textiles, tobacco, sugar, and liquors are manufactured. Settled about 1670, Niterói was chartered as a city in 1836. Pop. (1970) 297,720.

NITRATES. See NITRIC ACID.

NITRIC ACID, colorless, corrosive liquid, HNO_3 , with sp.gr. 1.502, m.p. -42°C . (-44°F .), b.p. 83°C . (181°F .). Medieval alchemists called it *aqua fortis* ("strong water"); the name "aqua fortis" is still used today. Commercially nitric acid is made chiefly by the action of sulfuric acid on sodium nitrate, also known as Chile saltpeter. It is also made by the catalytic oxidation of ammonia; see NITROGEN FIXATION. Nitric acid is a strong acid and a strong oxidizing agent. When dropped on the skin the acid produces a yellow coloration because of the reaction of the acid with certain proteins to form yellow xanthoproteic acid. The concentrated nitric acid used commercially contains about 71 percent HNO_3 ; the rest is water. Fuming nitric acid, which is widely used commercially, consists of nitric acid with gaseous nitrogen peroxide in solution. It is red or brown in color and more active than colorless nitric acid. Ordinary and fuming nitric acid have wide application. They are used in chemical synthesis, in the nitration of organic materials to form nitro compounds, and in the manufacture of dyes and explosives.

Nitrates. The salts of nitric acid are called nitrates. Potassium nitrate, or saltpeter (q.v.), and sodium nitrate are the nitrates of greatest commercial importance. Nearly all nitrates are soluble in water; one of the exceptions is bismuth subnitrate, $\text{BiONO}_3 \cdot \text{H}_2\text{O}$, which is formed by the reaction of bismuth nitrate, $\text{Bi}(\text{NO}_3)_3$, with water and is used in medicine for treating intestinal disorders. Amitol, a powerful explosive, is a mixture of ammonium nitrate and trinitrotoluene (TNT). The reaction of nitric acid with organic compounds yields many important nitrates, such as nitroglycerin (q.v.) and nitrocellulose; see CELLULOSE. Calcium, sodium, potassium, and ammonium nitrates are used in fertilizers to provide a source of nitrogen for plant growth.

NITROCELLULOSE. See CELLULOSE.

NITROGEN, gaseous element with at.no. 7, at.wt. 14.007, b.p. -195.78°C (-320.404°F), m.p. -209.96°C (-345.928°F) (both at standard atmospheric pressure), sp.gr. 1.2506, and symbol N. It was isolated by the British physician Daniel Rutherford (1749-1819) in 1772 and recognized as an elemental gas by the French chemist Antoine Laurent Lavoisier (q.v.) about 1776. The free gas composes about four fifths (78.03 percent) by volume of the atmosphere.

Properties. Nitrogen is inert and serves as a diluent for oxygen in burning and respiration processes. It is an important element in plant nutrition; certain bacteria in the soil accomplish the conversion of atmospheric nitrogen to a form, such as nitrate, in which plants can absorb nitrogen, a process called nitrogen fixation (q.v.). Nitrogen in the form of protein (q.v.) is an important constituent of animal tissue. The element occurs in the combined state in minerals, of which saltpeter, KNO_3 , and Chile saltpeter, NaNO_3 , are commercially important.

Nitrogen is a colorless, odorless, tasteless, nontoxic gas. It can be condensed into a colorless liquid, which can in turn be compressed to a colorless, crystalline solid. Nitrogen exists in two natural isotopic forms, and four radioactive isotopes have been artificially prepared.

Nitrogen is obtained from the atmosphere by passing air over heated copper or iron. The oxygen is removed from the air, leaving nitrogen mixed with inert gases. Pure nitrogen is obtained by fractional distillation of liquid air; because liquid nitrogen has a lower boiling point than liquid oxygen the nitrogen distills off first and can be collected; see DISTILLATION: *Fractional Distillation*.

Uses. Nitrogen is chemically inert and combines with other elements only at very high temperatures or pressures. It is converted to an active form by passing it through an electric discharge at low pressure. The nitrogen so produced is very active, combining with alkali metals to form azides; with the vapor of zinc, mercury cadmium, and arsenic to form nitrides; and with many hydrocarbons to form hydrocyanic acid and cyanides, also known as nitriles. Activated nitrogen returns to ordinary nitrogen in about one minute.

In the combined state nitrogen takes part in many reactions and forms so many compounds that a systematic scheme of compounds containing nitrogen in place of oxygen was created by the American chemist Edward Franklin (1862-1937). In compounds nitrogen exists in all of the valence states between -3 and $+5$. Ammonia, hydrazine, and hydroxylamine represent compounds in which the valence of nitrogen is -3 , -2 , and -1 , respectively. Oxides of nitrogen represent nitrogen in all the positive valence states. Nitrous oxide, N_2O , a colorless gas with b.p. -89.5°C . (-129.1°F .) is prepared by heating ammonium nitrate. It is popularly called "laughing gas" because it tends to cause hysterical laughter in individuals who inhale it. Mixed with oxygen it is used as an anesthetic in minor operations. Nitric oxide, NO , a colorless gas

with b.p. -151°C (-239.8°F), is produced commercially by the oxidation of ammonia in the presence of a catalyst. Nitrogen trioxide, N_2O_3 , a blue liquid or a red-brown gas, with b.p. 35°C (38.3°F), is the acid anhydride of nitrous acid. Nitrogen dioxide, NO_2 , a yellow liquid or red-brown gas, with b.p. 21.3°C (70.33°F), is the acid anhydride of nitric acid. Nitrogen pentoxide, N_2O_5 , is a white solid with m.p. 30°C (86°F).

Among other important nitrogen-containing compounds are amines, azo- and diazo-compounds, cyanates, cyanogen, fulminates, nitro compounds, nitric acid and nitrates, nitrous acid and nitrites, and urea.

NITROGEN FIXATION, biological or industrial process by which molecular atmospheric nitrogen (q.v.) is converted into a chemical compound essential for plant growth, or for use in industrial chemical production.

Biological Fixation. Natural fixation is carried on by soil microorganisms such as the nonsymbiotic (free-living) bacteria (q.v.), which function aerobically (in the presence of oxygen), or anaerobically, and by symbiotic bacteria of the genus *Rhizobium*, which attach themselves to the root nodules of leguminous plants such as clover, alfalfa, and peas; see **LEGUME**. By making available utilizable nitrogen, these bacteria derive energy for their life functions and at the same time enrich the soil. Legume crops are planted because they replenish the nitrogen in the soil that is depleted by other crops. The amount of combined nitrogen produced by soil bacteria varies with temperature, moisture and richness of soil, and related factors. See **HUMUS**; **SOILS AND SOIL MANAGEMENT**: *Soil Chemistry: Organic Soil Materials*. The need for fixed nitrogen in agriculture today is far greater than can be supplied by the natural biological processes, and the production of nitrogen compounds from atmospheric nitrogen is a major chemical industry.

Industrial Fixation. The principal industrial nitrogen-fixation process today is the production of ammonia (q.v.) by passing a mixture of atmospheric nitrogen and hydrogen over a metallic catalyst (see **CATALYSIS**) at $500\text{--}600^{\circ}\text{C}$ ($932\text{--}1112^{\circ}\text{F}$). Ammonia is then oxidized to form nitric acid, which is in turn combined with ammonia to yield ammonium nitrate, used chiefly in explosives (q.v.) and fertilizers; see **FERTILIZER**. This process was discovered by the German chemists Karl Bosch and Fritz Haber (qq.v.). In another method, cyanamide, which is used as a fertilizer or in the production of cyanides, is produced by passing atmospheric ni-

trogen over heated calcium carbide in the presence of a catalyst.

NITROGLYCERIN, powerful explosive, of formula $\text{C}_3\text{H}_5(\text{NO}_3)_3$, derived from glycerin by treatment with a mixture of concentrated sulfuric and nitric acids. It is a heavy, oily, colorless or light-yellow liquid, of sp.gr. 1.60, with a sweet, burning taste. It gives two crystalline forms, one melting at 2.8°C (37°F), the other at 13.5°C (56.3°F). It solidifies at 12°C (53.6°F). Nitroglycerin burns quietly when heated in air, but explodes when heated above 218°C (424°F) or when heated in a closed vessel. It is very sensitive to shock and therefore dangerous to transport. Although discovered in 1847, nitroglycerin was not used as an explosive (see **EXPLOSIVES**) until the Swedish engineer and inventor Alfred Bernhard Nobel (q.v.) used it in making dynamite (q.v.) in 1866. Nitroglycerin is a common explosive today and is usually mixed with an inert, porous material such as sawdust. When detonated, it produces about 10,000 times its own volume of gas. It is eight times as powerful as gunpowder (q.v.) in proportion to relative weight, and thirteen times as powerful in proportion to relative volume. Nitroglycerin is used medically, in doses of 0.2 to 0.6 mg, as an agent to cause dilation of blood vessels.

NITROUS OXIDE. See **NITROGEN**.

NIXON, Richard Milhous (1913-), thirty-seventh President of the United States (1969-74). He is the only president to resign from office.

Nixon was born in Yorba Linda, Calif., on Jan. 9, 1913. His parents were poor, and his early life was one of hard work and study. He was a gifted student, finishing second in his class at Whittier College (1934) in Whittier, Calif., and third in his class at Duke University Law School (1937). Unable to find a position with a Wall Street (New York City) law firm after his graduation, Nixon returned to Whittier to practice. There he met Thelma Catherine (Pat) Ryan, whom he married in 1940. Nixon enlisted in the United States Navy in 1942 and served as a supply officer in the South Pacific during World War II. He left the service as a lieutenant commander.

Back in Whittier in 1946, Nixon was persuaded by a group of Southern California Republicans to challenge Democratic congressman Jerry Voorhis. The war veteran campaigned vigorously, tabbed the liberal Voorhis as a dangerous left-winger, and won by 16,000 votes. In 1948 and 1949 Nixon achieved a national reputation in the United States House of Representatives as a member of the Committee on Un-American Activities in the investigation of what became known as the Hiss Case (q.v.). In 1950



President Richard M. Nixon in 1972.

Nixon ran for the United States Senate against congresswoman Helen Gahagan Douglas, whom he labeled "the Pink Lady" for what he alleged to be her pro-Communist sympathies. He won the election, but his campaign tactics were widely criticized.

Vice-President. In 1952 Nixon was nominated to be the running mate of Republican Presidential candidate Dwight D. Eisenhower (q.v.). When it was disclosed that as a Senator Nixon had accepted an \$18,000 fund for "political expenses" from California businessmen, he was nearly dropped from the Republican ticket. Nixon's televised self-defense, called the "Checkers" speech because of a sentimental reference to his dog Checkers, saved his political life. As Vice-President, Nixon emerged as a vigorous Republican spokesman during the Eisenhower years, campaigning in a cut-and-thrust style that contrasted with Eisenhower's nonpartisan aloofness. In nonelection years, Nixon toured the country trying to bolster Republican Party finances and spirit. He also developed foreign affairs credentials by visiting numerous other countries, including the Soviet Union, where an impromptu "kitchen debate" with Nikita S. Khrushchev made worldwide headlines in July, 1959. As undisputed party leader at the end of Eisenhower's second term, Nixon easily won the

Presidential nomination in 1960. Against the articulate, rich, and politically well-connected John F. Kennedy, however, the Nixon edge in experience and prominence melted away. Kennedy won with a popular-vote margin of 113,000 votes out of 68,800,000 cast.

Returning to California, Nixon sought to revitalize his political career by challenging Governor Edmund G. (Pat) Brown in the 1962 gubernatorial race. Defeated, Nixon angrily announced his withdrawal from active politics. He moved to New York City and undertook a lucrative law practice. But he continued to speak out on foreign-policy issues, address Republican fund rallies, and maintain his strong influence in the party. By 1968, he was poised again to try for the Presidency, this time as a more seasoned and temperate "new Nixon". With Spiro T. Agnew as the Vice-Presidential candidate, the Republican campaign made skillful use of television, benefited from national dissatisfaction with the war in Vietnam, and profited from factional divisions in the Democratic camp. Nixon defeated Hubert H. Humphrey (q.v.) with a narrow popular-vote majority of about 500,000 votes.

President. At the pinnacle in 1969, President Nixon organized the White House to protect his energy and time. Routine matters and petitioners and most administrative affairs were dealt with by such powerful aides as H. R. Haldeman, John Ehrlichman, and Charles Colson. This freed the President to turn to what had become his absorbing interest: international diplomacy. With Henry A. Kissinger (q.v.) as his most trusted foreign-policy adviser, Nixon redefined the American role in the world, suggesting limits to U.S. resources and commitments. "After a period of confrontation", he declared in his inaugural address, "we are entering an era of negotiation". He ordered a gradual withdrawal of the 500,000 U.S. troops in South Vietnam. But the withdrawal took four years, during which the war raged and U.S. casualties mounted. Nixon authorized a U.S. incursion into Cambodia in 1970 and the bombing of Hanoi and the mining of Haiphong harbor in 1972. These actions were extremely unpopular, but he credited them with helping to bring about a negotiated settlement by which all U.S. forces were pulled out and all known U.S. prisoners of war were released before the end of March, 1973.

Sensing that the time was right to make an overture to China, Nixon sent Kissinger to confer secretly with Chinese Premier Chou En-lai (q.v.) in July, 1971. Nixon's own 1972 summit meeting in China was a diplomatic triumph that

left the President's critics, accustomed to his fervent anti-Communism, astonished and off-balance. Within a few weeks, Nixon was in Moscow to negotiate the first step in a strategic arms limitation agreement. Born in that session was the era of "détente", a search for accommodation between the two superpowers and an effort to reduce the danger of nuclear war.

Other parts of the world were not neglected. In the strategically vital Middle East, Nixon established links with Egypt while maintaining the U.S. commitment to Israel. After the Yom Kippur war of 1973, the U.S. replaced the Soviet Union as the dominant influence in the area.

At home, Nixon adopted "The New Federalism", a program designed to end what he said was the Democratic habit of "throwing money at problems". Part of the plan—revenue sharing with States and cities—was passed by Congress, and some \$30,000,000,000 in Federal taxes were directed toward local needs. While espousing the fiscal conservatism traditional to his party, Nixon held to no set economic course. After first advocating a balanced budget, he turned to deficit financing. Having decided against wage and price controls to battle rising inflation rates, he reversed himself dramatically in August, 1971. These controls were imposed, with limited success, in four phases extending into 1974. Nixon's economic policies were bold but inconsistent and ultimately powerless to prevent the national slide in 1974 into the worst recession since the 1930's.

On racial matters, Nixon generally adopted a passive stance toward efforts by American Blacks to achieve educational, economic, and social equality. He personally opposed busing but insisted that the law be upheld in cases where the courts required it.

The Nixon response to rising urban crime rates included demands for stricter law enforcement and less "coddling" of criminals and radical activists. The leading voice for this politically popular theme of "law and order" was Attorney General John N. Mitchell (q.v.), the President's former law partner and campaign manager. Nixon's four Supreme Court appointments, men whom he called "strict constructionists", brought a more conservative cast to the Court. They were Chief Justice Warren Burger and Justices Harry Blackmun, Lewis Powell, Jr., and William Rehnquist (qq.v.).

Watergate and Resignation. Up for reelection in 1972, Nixon was fresh from the Peking and Moscow triumphs and enjoying the peak of his popularity. He defeated Democratic Senator George S. McGovern by the second-largest ma-

jority in U.S. history. Only one small cloud appeared on the horizon. The attempted burglary and wiretapping of the Democratic National Committee headquarters on June 17, 1972, at the Watergate (q.v.) complex had been traced to men hired by some of the President's closest advisers. Newspaper reporters took the slender thread found at the Watergate burglary and followed it to the White House. Through determined reporting, a larger picture of political corruption was uncovered. Illegal campaign contributions, political "dirty tricks", and irregularities in Nixon's income taxes were unearthed as the story grew during 1973. Testimony before the Senate Select Committee on Presidential Campaign Activities, chaired by Senator Sam Ervin, Jr., revealed that extensive tape recordings existed of conversations held in Nixon's office. The various investigations, including that of Archibald Cox, who was appointed special prosecutor for the case in May, 1973, began to focus on the release of these vital tapes.

Public trust in Nixon's leadership plummeted after he had Cox dismissed in October, 1973. To compound the President's problems, Vice-President Agnew, facing bribery charges, resigned in the same month. In his choice of a replacement, Nixon settled on a popular U.S. congressman certain of quick confirmation: Gerald R. Ford of Michigan, who was sworn in on Dec. 6, 1973.

A Federal grand jury named the President in March, 1974, as an unindicted co-conspirator in a conspiracy to obstruct justice in the Watergate investigation. Attorney Leon Jaworsky, who replaced Cox as special Watergate prosecutor, continued to press for the White House tapes while the House Judiciary Committee began to investigate the case for impeachment.

Nixon tried to reestablish his authority with trips to the Middle East and the Soviet Union in the summer of 1974. But the Watergate net closed around him tighter upon his return. On July 24, the Supreme Court unanimously ruled that the President had to turn over the last and most self-incriminating tapes. One of these, recording his order to the Federal Bureau of Investigation to halt its investigation of the Watergate break-in, was conclusive evidence—the so-called "smoking gun"—of Nixon's primary role in a cover-up. The Judiciary Committee recommended impeachment to the full House of Representatives. On the evening of August 8, Nixon went on nationwide television to announce his decision, unprecedented in U.S. history, to resign. At noon on August 9, Ford took the oath of office as Nixon was being flown to retirement in California. H.S.S.

NIZHNIY TAGIL

NIZHNIY TAGIL, city of the Soviet Union, in the Russian S.F.S.R., on the Tagil R., at the E. base of the Ural Mts., about 75 miles N.E. of Sverdlovsk. An important railroad junction and industrial center, the city is in a region noted for its diversified mineral resources, including iron ore, manganese, copper, gold, and platinum. There are steel mills and factories producing railroad cars, heavy machinery, chemicals, and coke. The city was founded in 1725 as a mining community. It continued to grow in size and importance, especially during World War II. Pop. (1970) 378,000.

N'KONGSAMBA, city in Cameroon, and capital of Mungo Department, at the eastern foot of the volcanic Manengouba massif, 85 miles N.E. of Douala. A road and trade center, N'Kongsamba is the terminus of the railroad to the port of Douala and is surrounded by coffee and banana plantations. Industries include sawmilling, palm-oil processing, and brewing. The city has a teachers' college and technical schools. The railroad was built to the city, then called Samba, in 1912 under German administration. Occupied by the British in 1914, the city came under French rule in 1916 and in 1923 became an administrative center, succeeding Baré, 6 mi. to the N. Pop. (1970 est.) 71,000.

NKRUMAH, Kwame. See GHANA: *History*.

NOAH, in the Old Testament, son of Lamech, tenth in descent from Adam (see ADAM AND EVE) and, as survivor with his family of the Flood (see DELUGE), the father of all humanity (Gen. 6-9). According to the Biblical account, he was spared for his piety when God destroyed the corrupt world by a flood lasting forty days and forty nights. He was forewarned to build the Ark, a ship, for his preservation and to take on board with him his wife and three sons, Shem, Ham, and Japheth (qq.v.; also see JAPHETIDES); his sons' wives; and mated specimens of all animals on earth. By scriptural account (Gen. 9:29) he lived 950 years. Xithuthros, Prithu, and Deucalion (q.v.) are heroes of similar flood stories in the Babylonian, Greek, and other cultures; see BABYLONIAN LANGUAGE AND LITERATURE: *Babylonian Literature*. Another text (Gen. 9:18-27) represents Noah as a shameless drunkard, the discoverer of wine making; describing his sons as progenitors of the three races of mankind, it denounces Canaan (q.v.), Ham's son, in what is presumably a symbolic reference to the dissoluteness of the Canaanites (q.v.).

NOAH, BOOK OF, or APOCALYPSE OF NOAH, noncanonical part of the Old Testament (see BIBLE, CANON OF THE) that gives an account of the laws made by Noah (q.v.) for his children.

It was written probably between 200 and 161 B.C. and has not been preserved as an independent work, but fragments of it are incorporated in the Ethiopic Book of Enoch (see ENOCH), and it is referred to in Jubilees (10:13; 30:10).

NOBEL, Alfred Bernhard (1833-96), Swedish chemist, inventor, and philanthropist, born in Stockholm. After receiving an education in Saint Petersburg (now Leningrad), Russia, and in the United States, where he studied mechanical engineering, he returned to St. Petersburg to work under his father, developing mines, torpedoes, and other explosives. In a family-owned factory in Heleneborg, Sweden, he produced (1867) the formula for dynamite (q.v.). He later produced ballistite, one of the first smokeless powders. At the time of his death he controlled factories for the manufacture of explosives in many parts of the world. His will provided that the major portion of his \$9,200,000 estate be set up as a fund to establish yearly prizes for merit in physics, chemistry, medicine and physiology, literature, and world peace. (A prize in economics has been awarded since 1969.) See NITROGLYCERIN; NOBEL PRIZES.

NOBELIUM, transuranic, radioactive element in the actinide series with at.no. 102, at.wt. 254, and symbol No, named for Alfred Bernhard Nobel (q.v.). It is not found in nature but is produced artificially. An isotope of nobelium was discovered in 1958 at the Lawrence Radiation Laboratory of the University of California. It was produced by bombarding curium-246 with carbon-12 ions. The isotope produced has a half-life of 3 sec. Its chemical properties are unknown. See TRANSURANIUM ELEMENTS.

NOBEL PRIZES, awards granted annually to persons or institutions for outstanding contributions during the year previous to the grant in the fields of physics, chemistry, physiology or medicine, literature, and international peace. The yearly prizes are awarded from the interest accruing from a trust fund provided by the testament of the Swedish inventor and philanthropist Alfred Bernhard Nobel (q.v.). According to the will, "[The capital [provided by conversion of residue property into money] shall constitute a fund, the interest accruing from which shall be annually awarded in prizes to those persons who shall have contributed most materially to the benefit of mankind during the year immediately preceding. The said interest shall be divided into five equal amounts, to be apportioned as follows: One share to the person who shall have made the most important discovery or invention in the domain of Physics; one share to the person who shall have made the most



important Chemical discovery or improvement; one share to the person who shall have made the most important discovery in the domain of Physiology or Medicine; one share to the person who shall have produced in the field of Literature the most distinguished work of an idealistic tendency; and finally, one share to the person who shall have done most to promote the Fraternity of Nations and Abolition or Diminution of Standing Armies and the Formation or Increase of Peace Congresses. The prizes for Physics and Chemistry shall be awarded by the Swedish Academy of Science in Stockholm; that for Physiology or Medicine by the Caroline Medico-Surgical Institute in Stockholm; the prize for Literature by the Academy in Stockholm and that for Peace by a Committee of five persons to be elected by the Norwegian Storting. I declare it to be my express desire that, in the awarding of prizes, no consideration whatever be paid to the nationality of the candidates, that is to say, that the most deserving be awarded the prize, whether of Scandinavian origin or not."

The fund is controlled by the board of directors of the Nobel Foundation, which serves for two-year periods and consists of five members, four elected by representatives of the awarding bodies mentioned in the will and the fifth appointed by the Swedish government. In addition to a cash award each winner also receives a gold medal and a diploma bearing his name and field of achievement. The judges often have divided the prize for achievement in a particular field among two or three persons. Prizes may also be

Top row, left to right: Obverse of the medals for physics and chemistry, medicine or physiology and literature; reverses of the medals for physics and chemistry and for medicine or physiology. Bottom row, left to right: reverse of the medal for literature; reverse of the medal for peace; obverse of the medal for peace.

Swedish Information Service

withheld for a year, but if not distributed, the money reverts to the original fund. To further the purposes of the foundation, separate institutes have been established, in accordance with Nobel's will, in Sweden and Norway for advancement of each of the five original fields for which the prizes are awarded. The first Nobel prizes were awarded on Dec. 10, 1901.

In 1969, to commemorate its 300th anniversary, the national bank of Sweden endowed the Alfred Nobel Memorial Prize in economics, to be awarded by the Swedish Academy of Science. It has been awarded as follows: in 1969, to Ragnar Frisch of Norway and Jan Tinbergen of the Netherlands; in 1970, to Paul A. Samuelson of the U.S.; in 1971, to Simon Kuznets of the U.S.; in 1972, to Sir John R. Hicks of Great Britain and Kenneth J. Arrow of the U.S.; in 1973, to Russian-born Wassily Leontief, who has been associated with Harvard University; in 1974, to F. A. von Hayek of Austria and Gunnar Myrdal of Sweden; in 1975 to Leonid Kantorovich of the U.S.S.R. and T. C. Koopmans of the U.S.; in 1976 to Milton Friedman of the U.S.; in 1977 to James Meade of Great Britain and Bertil Ohlin of Sweden; and in 1978 to Herbert A. Simon of the U.S.

On the following pages are the names of the Nobel prizewinners in the five original categories. See also articles on individual recipients.

NOBEL PRIZE WINNERS

YEAR	LITERATURE	CHEMISTRY	PHYSICS	PHYSIOLOGY OR MEDICINE	PEACE
1901	Sully Prudhomme, René François Armand (Fr.)	Van't Hoff, Jacobus H. (Neth.)	Röntgen, Wilhelm C. (Ger.)	Bering, Emil Adolph von (Ger.)	Durrant, Jean Henri (Switz.) Passy, Frédéric (Fr.) Ducommun, Elie (Switz.) Göbel, Charles A. (Switz.) Cromer, Sir William R. (G.B.)
1902	Mömmen, Theodor (Ger.)	Flischer, Emil H. (Ger.)	Lorentz, Hendrik A. (Neth.) Zeeman, Pieter (Neth.) Curie, Pierre (Fr.) Curie, Marie (Fr.) Becquerel, Antoine H. (Fr.) Rayleigh John W. (G.B.)	Ross, Sir Ronald (G.B.) Finsen, Niels R. (Dan.)	
1903	Björnson, Björnstjerne (Nor.)	Arrhenius, Svante A. (Sw.)	Thomson, Sir Joseph John (G.B.)	Pavlov, Ivan P. (Russ.)	Institute of International Law
1904	Mistral, Frédéric (Fr.) Echegaray y Eizaguirre, José (Sp.) Sienkiewicz, Henryk (Pol.) Carraccioli, Giosuè (It.)	Ramsay, Sir William (G.B.) Bayer, Adolf von (Ger.) Moissan, Henri (Fr.)	Lenard, Philipp (Ger.) Thomson, Sir Joseph John (G.B.)	Koch, Robert (Ger.) Golgi, Camillo (It.) Ramón y Cajal, Santiago (Sp.) Laveran, Charles L.A. (Fr.)	Sutner, Bertha von (Aust.) Roosevelt, Theodore (U.S.)
1907	Kipling, Rudyard (G.B.)	Buchner, Eduard (Ger.)	Michelson, Albert A. (U.S.)	Elvirich, Paul (Ger.) Metchnikoff, Élie (Russ.)	Moneta, Ernesto T. (It.) Renaud, Louis (Fr.) Arnoldson, Klem P. (Sw.) Bajer, Fredrik (Den.) Beernaert, Auguste M. (Belg.) États-Unies de Constantin, Baron d' (Fr.)
1908	Eucken, Rudolf C. (Ger.)	Rutherford, Ernest (G.B.)	Lippmann, Gabriel (Fr.)	Kocher, Emil T. (Switz.)	International Peace Bureau Asser, Tobias M.C. (Neth.) Fried, Alfred H. (Aust.) Root, Eliu (U.S.)
1909	Lagerlöf, Selma O.L. (Sw.)	Ostwald, Wilhelm (Ger.)	Marconi, Marchese G. (It.) Braun, Karl F. (Ger.)	Kossel, Albrecht (Ger.) Gullstrand, Alvar (Ger.)	La Fontaine, Henri (Belg.) Not awarded
1910	Hayase, Paul von (Ger.) Maeterlinck, Maurice (Belg.)	Wallach, Otto (Ger.) Curie, Marie (Fr.)	Waals, Johannes D. van der (Neth.) Wien, Wilhelm (Ger.)	Carrel, Alexis (Fr.)	Not awarded
1912	Hauptmann, Gerhart (Ger.)	Grignard, Victor (Fr.) Sabatier, Paul (Fr.) Werner, Alfred (Switz.) Richards, Theodore W. (U.S.) Willstätter, Richard (Ger.)	Dalén, Nils Gustaf (Sw.) Kamerlingh Onnes, Heike (Neth.) Laue, Max von (Ger.) Bragg, Sir William Henry (G.B.) Bragg, Sir William L. (G.B.) Not awarded	Richet, Charles R. (Fr.) Barany, Robert (Aust.) Not awarded	Not awarded
1913	Tagore, Sir Rabindranath (Ind.)	Not awarded	Planck, Max Karl E.L. (Ger.) Stark, Johannes (Ger.) Guillaume, Charles E. (Fr.) Einstein, Albert (U.S.)	Not awarded	International Committee of the Red Cross
1914	Not awarded	Not awarded	Not awarded	Not awarded	Wilson, Woodrow (U.S.)
1915	Not awarded	Not awarded	Not awarded	Not awarded	Bourgeois, Léon V.A. (Fr.) Brannting, Karl H. (Sw.) Lange, Christian L. (Nor.) Nansen, Fridtjof (Nor.)
1916	Heldensland, Verner von (Sw.) Gjerulup, Karl (Den.)	Not awarded	Bohr, Niels Henrik D. (Den.)	Hill, Archibald V. (G.B.) Meyerhof, Otto (Ger.) Barnard, Sir Frederick G. (Can.) Macleod, John James R. (G.B.) Einhoven, Willem (Neth.) Not awarded	Not awarded
1917	Pontoppidan, Henrik (Den.)	Not awarded	Millikan, Robert A. (U.S.)	Not awarded	Dawes, Charles G. (U.S.) Chantrel, Sir Joseph Austin (G.B.)
1918	Not awarded	Not awarded	Not awarded	Not awarded	Brand, Aristide (Fr.) Stresemann, Gustav (Ger.) Buisson, Ferdinand (Fr.) Quiddie, Ludwig (Ger.)
1919	Spitteler, Carl (Switz.)	Not awarded	Not awarded	Not awarded	Not awarded
1920	Hamsun, Knut (Nor.)	Not awarded	Not awarded	Not awarded	Kellogg, Frank B. (U.S.)
1921	France, Anatole (Fr.)	Not awarded	Not awarded	Not awarded	Söderström, Nalhan (U.S.) Adams, Jane (U.S.) Butler, Nicholas M. (U.S.) Not awarded
1922	Benavente y Martinez, Jacinto (Sp.)	Aston, Francis W. (G.B.)	Not awarded	Not awarded	Not awarded
1923	Yeats, William Butler (Ire.)	Pregl, Fritz (Aust.)	Not awarded	Not awarded	Not awarded
1924	Reymont, Władysław S. (Pol.)	Not awarded	Not awarded	Not awarded	Not awarded
1925	Shaw, George Bernard (G.B.)	Zaimgold, Richard (Ger.)	Not awarded	Not awarded	Not awarded
1926	Deledda, Grazia (It.)	Svedberg, The (Sw.)	Perrin, Jean Baptiste (Fr.)	Fibiger, Johannes (Den.)	Not awarded
1927	Bergson, Henri Louis (Fr.)	Wieland, Heinrich O. (Ger.)	Compton, Arthur H. (U.S.) Wilson, Charles T. (G.B.) Richardson, Sir Owen (G.B.) Broglie, Louis Victor de (Fr.)	Wagner von Jauregg, Julius (Aust.)	Not awarded
1928	Underhill, Sigrid (Nor.)	Windaus, Adolf (Ger.) Harden, Sir Arthur Euler-Chelapin, Hans von (Sw.) Fischer, Hans (Ger.)	Not awarded	Not awarded	Not awarded
1929	Mann, Thomas (Ger.)	Not awarded	Not awarded	Not awarded	Not awarded
1930	Lewis, Sinclair (U.S.)	Not awarded	Not awarded	Not awarded	Not awarded
1931	Karlfeldt, Erik Axel (Sw.)	Not awarded	Not awarded	Not awarded	Not awarded
1932	Galsworthy, John (G.B.)	Not awarded	Not awarded	Not awarded	Not awarded

NOBEL PRIZE WINNERS (CONTINUED)

YEAR	LITERATURE	CHEMISTRY	PHYSICS	PHYSIOLOGY OR MEDICINE	PEACE
1933	Bum, Ivan Alekseevich (U.S.S.R.)	Not awarded	Dirac, Paul Adrien M. (G.B.) Schrödinger, Erwin (Aust.) Not awarded	Morgan, Thomas H. (U.S.)	Angell, Sir Norman (G.B.)
1934	Pirandello, Luigi (It.)	Urey, Harold C. (U.S.)	Chadwick, Sir James (G.B.)	Minot, George R. (U.S.) Murphy, William P. (U.S.) Whipple, George H. (U.S.) Spemann, Hans (Ger.)	Henderson, Arthur (G.B.) Ossietzky, Carl von (Ger.)
1935	Not awarded	Joliot-Curie, Irène (Fr.) Joliot-Curie, Frédéric (Fr.) Debye, Peter Joseph W. (U.S.)	Anderson, Carl D. (U.S.) Heise, Victor F. (Aust.) Davison, Clinton J. (U.S.) Thomson, Sir George P. (G.B.) Fermi, Enrico (It.)	Dale, Sir Henry Hallett (G.B.) Lowry, Otto (U.S.) Szent-Györgyi von Nagyspallot, Albert (U.S.) Heymans, Cornelie (Belg.)	Saavedra Lamas, Carlos (Arg.) Cecil, Edgar A. (G.B.)
1936	Martin du Gard, Roger (Fr.)	Haas, Walter N. (G.B.) Karrer, Paul (Switz.) Kuhn, Richard* (U.S.)	Lawrence, Ernest O. (U.S.)	Domagk, Gerhard* (Ger.)	Nansen International Office for Refugees Not awarded
1939	Sillanpää, Frans Eemil (Fin.)	Butenandt, Adolph* (Ger.) Ruzicka, Leopold (Switz.) Not awarded	Not awarded	Not awarded	Not awarded
1940	Not awarded	Not awarded	Not awarded	Not awarded	Not awarded
1941	Not awarded	Not awarded	Not awarded	Not awarded	Not awarded
1942	Not awarded	Not awarded	Not awarded	Not awarded	Not awarded
1943	Not awarded	Not awarded	Not awarded	Not awarded	Not awarded
1944	Jensen, Johannes V. (Den.)	Hahn, Otto (Ger.)	Rabi, Isidor I. (U.S.)	Dale, Edward A. (U.S.) Dani, Carl Peter H. (Den.) Erlanger, Joseph (U.S.) Gasser, Herbert S. (U.S.) Fleming, Sir Alexander (G.B.) Chalm, Ernest Boris (G.B.) Forey, Sir Howard W. (G.B.) Muller, Hermann J. (U.S.)	International Committee of the Red Cross Hull, Cordell (U.S.)
1945	Mistral, Gabriela (Chile)	Virtanen, Arturi I. (Fin.)	Pauli, Wolfgang (U.S.)	Not awarded	Not awarded
1946	Hesse, Hermann (Switz.)	Northrop, John H. (U.S.) Sumner, James B. (U.S.) Stanley, Wendell M. (U.S.) Robinson, Sir Robert (G.B.)	Bridgman, Percy W. (U.S.)	Not awarded	Not awarded
1947	Gide, André (Fr.)	Not awarded	Appleton, Sir Edward V. (G.B.)	Not awarded	Not awarded
1948	Eliot, Thomas* (Stearns) (G.B.) Faulkner, William (U.S.)	Tiselius, Arne V.K. (Sw.) Glauque, William F. (U.S.)	Blackett, Patrick M.S. (G.B.) Yukawa, Hideki (Japan)	Cori, Carl F. (U.S.) Cori, Gerty Theresa R. (U.S.) Rousley, Bernardo A. (Arg.) Miller, Paul (Switz.) Hess, Walter R. (Switz.) Moniz, Antonio C. (Port.) Hess, Philip S. (U.S.) Kendall, Edward C. (U.S.) Reichstein, Tadous (Switz.) Thellier, Max (G. At.)	Friends Service Council (G.B.) American Friends Service Committee (U.S.) Boyd Orr, John (G.B.)
1949	Russell, Bertrand A.W. (G.B.)	Dale, Otto Paul H. (W. Ger.) Auld, Kurt (W. Ger.)	Powell, Cecil F. (G.B.)	Moniz, Antonio C. (Port.) Hess, Philip S. (U.S.) Kendall, Edward C. (U.S.) Reichstein, Tadous (Switz.) Thellier, Max (G. At.)	Not awarded
1951	Lagerkvist, Pär F. (Sw.)	Saeborg, Glenn T. (U.S.) McLellan, Edwin M. (U.S.)	Cockcroft, Sir John D. (G.B.) Watson, Ernest T.S. (Ire.) Bloch, Felix (U.S.)	Waksman, Selman A. (U.S.) Lipman, Fritz A. (U.S.) Krebs, Hans Adolf (G.B.) Enders, John F. (U.S.) Weiler, Thomas H. (U.S.) Robbins, Frederick C. (U.S.) Thorelli, (Ago) Hugo (Sw.)	Not awarded
1952	Mauriac, François (Fr.)	North, Archer John P. (G.B.) Symge, Richard L.M. (G.B.) Staudinger, Hermann (W. Ger.)	Parcell, Edward M. (U.S.) Zemke, Felix (Neth.)	Waksman, Selman A. (U.S.) Lipman, Fritz A. (U.S.) Krebs, Hans Adolf (G.B.) Enders, John F. (U.S.) Weiler, Thomas H. (U.S.) Robbins, Frederick C. (U.S.) Thorelli, (Ago) Hugo (Sw.)	Schweitzer, Albert (Fr.)
1953	Churchill, Sir Winston (G.B.)	Not awarded	Not awarded	Not awarded	Not awarded
1954	Hemingway, Ernest (U.S.)	Pauling, Linus (U.S.)	Born, Max (W. Ger.) Bothe, Walter E. (Ger.)	Waksman, Selman A. (U.S.) Lipman, Fritz A. (U.S.) Krebs, Hans Adolf (G.B.) Enders, John F. (U.S.) Weiler, Thomas H. (U.S.) Robbins, Frederick C. (U.S.) Thorelli, (Ago) Hugo (Sw.)	Marshall, George C. (U.S.) United Nations High Commissioner for Refugees Not awarded
1955	Luxemburg, Halldor Kiljan (Iceland)	Du Vigneaud, Vincent (U.S.)	Lam, Willis Eugene Jr. (U.S.) Krich, Polykarp (U.S.)	Waksman, Selman A. (U.S.) Lipman, Fritz A. (U.S.) Krebs, Hans Adolf (G.B.) Enders, John F. (U.S.) Weiler, Thomas H. (U.S.) Robbins, Frederick C. (U.S.) Thorelli, (Ago) Hugo (Sw.)	Not awarded
1956	Jiménez, Juan Ramón (Sp.)	Hinshelwood, Sir Cyril (G.B.) Semenov, Nikolai N. (U.S.S.R.)	Shockley, William H. (U.S.) Brattain, Walter H. (U.S.) Bardeen, John (U.S.) Lee, Tsung Dao (U.S.) Yang Chen Ning (U.S.)	Waksman, Selman A. (U.S.) Lipman, Fritz A. (U.S.) Krebs, Hans Adolf (G.B.) Enders, John F. (U.S.) Weiler, Thomas H. (U.S.) Robbins, Frederick C. (U.S.) Thorelli, (Ago) Hugo (Sw.)	Not awarded
1957	Camus, Albert (Fr.)	Todd, Alexander Rictorius (G.B.)	Chernikov, Pavel A. (U.S.S.R.) Frig, Ilya M. (U.S.S.R.) Tamm, Igor V. (U.S.S.R.)	Waksman, Selman A. (U.S.) Lipman, Fritz A. (U.S.) Krebs, Hans Adolf (G.B.) Enders, John F. (U.S.) Weiler, Thomas H. (U.S.) Robbins, Frederick C. (U.S.) Thorelli, (Ago) Hugo (Sw.)	Not awarded
1958	Pasternak, Boris L.* (U.S.S.R.)	Sanger, Frederick (G.B.)	Not awarded	Not awarded	Not awarded

EL PRIZE WINNERS (CONTINUED)

PHYSICS

PEACE

(*) indicates that the cash prize was originally declined by the Nobelist; the medal and diploma alone were awarded to Gerhard Domagk in 1947 and to Richard Kuhn in 1949.

(*) indicates that the cash prize was originally declined by the Nobelists; the medal and diploma alone were awarded to Gerhard Domagk in 1947 and to Richard Kuhn in 1949.
 (**) indicates that the prize was declined by the Nobelists but that he remained listed as the winner of the award.

NOBILITY, body of persons within a state possessing various special hereditary privileges, rights, and honors, including titles; an aristocratic or patrician class. The nobilities of the various modern states of Europe came into existence when feudalism (q.v.), a social system based on land tenure, succeeded the imperial government of Rome after the Germanic invasions. During the unsettled social and economic conditions that followed the fall of the Roman Empire, some men acquired land, usually by conquest. These men then granted parts of their holdings to others, over whom they thereafter exercised certain rights, including that of taxation and the administration of justice, and from whom they were entitled to various services. Those who granted the land were known as lords and those who accepted it were known as vassals. The lords of a nation formed its nobility, their rank depending on the extent of their possessions. The preposition *de* in the names of French nobles and *von* in the names of German nobles (both meaning "of" or "from") express the idea of land ownership that is fundamental to the feudal concept of nobility.

Since the French Revolution the tendency in European countries has been strongly toward the abolition of hereditary titles. In France the nobility was first deprived of its special rights and privileges and then, in 1790, all hereditary titles were abolished by decree. Napoleon I (q.v.), however, created a new nobility, granting titles and estates to those who had served him well, especially in military affairs. After Napoleon's downfall Louis XVIII (q.v.), King of France, restored to the pre-revolutionary nobility its former privileges, rights, and honors. The Second Republic (1848-52) once more abolished nobility in France, but Napoleon III (q.v.), Emperor of France, restored the aristocratic class. Under the Third Republic (1871-1945) the nobility was once more abolished. In contemporary France, a person who has inherited a title may use it as part of his family name, but possesses none of the special rights or honors of the former nobility. In Germany titles of nobility existed from early medieval times until they were abolished when Germany became a republic in 1918; after 1918, members of the former nobility were permitted to use titles only as part of a name. In Russia titles of nobility similar to those of the nations of Western Europe were instituted by Peter I (q.v.), Emperor of Russia; all such titles were abolished by the revolution of 1917. In Spain titles of nobility still exist. Mem-

de Castilla. In Italy, Belgium, and Portugal, courtesy titles exist.

In Great Britain the sovereign still grants of nobility. The British nobility is divided an upper nobility and a lower nobility. The peer consists of all those who hold a hereditary rank above that of a baronet; it includes those with titles of duke, marquis, earl, viscount, baron. Among the lower nobility are those holding the rank of baronet, knight, and esquire. The upper nobility comprises the British peer and its members have the right to hereditary seats in the House of Lords. Life peers can be created. They hold the rank for their lives only; the title does not descend to their children. The Appellate Jurisdiction Act of 1901 gave the crown the right to give judges the rank of lord of appeal, and grant them life peerages. The Life Peerages Act of 1958 gave the crown the right to create other life peers, besides judges. An average of nine per year were created in the 1960's. All life peers have the right to vote in the House of Lords.

No nobility exists in the United States; Art. II, Section 9 of the Constitution of the United States (q.v.) specifies that no title of nobility shall be granted by the U.S., and in addition forbids any person holding government office from accepting any such title from a foreign ruler without the express consent of Congress. A private American citizen who accepts a title of nobility automatically resigns his citizenship.

NOBLE GASES. See **INERT GASES**.

NOCTURNE (Lat. *nocturnus*; from *nox, noc* "night"), in music, night piece or serenade, usually a languid or meditative instrumental composition. During the 18th century, the Italian term *notturno* was used as a title for compositions similar to the serenade (q.v.), performed as an evening divertissement. Several nocturns were composed by the Austrian composer Franz Joseph Haydn and Wolfgang Amadeus Mozart (qq.v.). The current use of the term "nocturne", however, refers almost solely to type of reflective, somewhat melancholy piano piece. The earliest nocturnes of this type were written during the 18th century by the Irish composer John Field (1782-1837). The form was subsequently developed in the 19th century particularly by the Polish composer Frédéric François Chopin (q.v.).

NODDY or NODDY TERN, common name for any tern (q.v.) in the genus *Anous*, indigenous to tropical and subtropical regions. Noddies have slightly angular bills and rounded

NORAD

several families. Cedar is also used to make boxes, and canoes are hollowed out of cedar tree trunks. Carved and painted totem poles are made from logs and erected in front of the houses as heraldic posts. Bark and root mats and baskets are manufactured, but pottery is unknown. Clothing was formerly made of skins and bark, or was woven from the hair of dogs and mountain goats. Nephrite, a form of jade, was widely used in the making of ceremonial and utilitarian objects, and the possession of copper plaques is still important as a measure of wealth and prestige.

Nootka religion is celebrated in elaborate winter ceremonies, characterized by the custom of the potlatch (q.v.). Their dead are placed in boxes secured high in the trees, or, in the case of important families, immured in caves. The leaders of the Nootka hold power through hereditary rank. Prestige depends upon displays of wealth and lavish distributions of gifts. Social rivalry is one of the most important factors in the life of these tribes, and fame is acquired or increased competitively, according to the number of celebrations provided by an individual and his lavishness in bestowing property. The Nootka formerly numbered about 6000; in a recent year their number was estimated at about 1600.

NORAD, acronym for North American Air Defense Command; see COAST DEFENSE: *Continental Air Defense*.

NORDENSKJÖLD, Baron Nils Erland Herbert (1877–1932), Swedish anthropologist, born in Stockholm, and educated at the University of Uppsala. He made extensive journeys of discovery in South America, bringing back large ethnographic collections for the museums of Stockholm. He investigated South American Indian life in Patagonia in 1899, in Argentina and Bolivia from 1901 to 1902, in Peru and Bolivia from 1904 to 1905, in Bolivia from 1908 to 1909, and conducted further field trips in the interior of South America in 1913. In the last-named year he became director of the ethnographic division of the Göteborg Museum. In 1927 he made ethnographic studies in Panama and Colombia. Nordenskjöld contributed numerous articles to scientific publications and wrote a number of books, several of which were translated into English and published as *Comparative Ethnographical Studies* (9 vol., 1919–31).

NORDHAUSEN, city of East Germany, in Erfurt District, on the Zorge R., 36 miles N.W. of the city of Erfurt. Industries include textile mills and

city from the mid-13th century until 1803, when it became part of Prussia. During World War II Nordhausen was the site of a notorious German concentration camp and one of the largest underground V-2 rocket plants in Germany. About 50 percent of the city was destroyed during the war. Pop. (1972 est.) 44,410.

NORDHOFF, Charles Bernard (1887–1947), American author, born in London, England, of American parents, and educated at Harvard University. His parents brought him to America when he was three years old. During World War I he served in France in the Escadrille Lafayette, a unit of the French flying corps. One of his associates was the American James Norman Hall (1887–1951). Nordhoff and Hall collaborated in the writing of such works as *Mutiny on the Bounty* (1932), *Men Against the Sea* (1933), and *Pitcairn's Island* (1934). These novels, set in the 18th century, are concerned with a mutiny on the British ship *Bounty* (q.v.) and the subsequent adventures of the mutineers on Pitcairn and Norfolk islands. Other works by Nordhoff and Hall include *Botany Bay* (1941), *Men Without Country* (1942), and *High Barbaree* (1945).

NORDKYN, CAPE. See NORTH CAPE.

NORD-OSTSEE CANAL, or KIEL CANAL, artificial waterway in West Germany linking the North Sea and the Baltic Sea. The canal extends in a N.E. direction across the State of Schleswig-Holstein from Brunsbüttelkoog, near the mouth of the Elbe R., to Kiel, on the Baltic. Constructed between 1887 and 1895 and subsequently enlarged, it is about 60 mi. long, 335 ft. wide, and 36 ft. deep. The canal shortened the distance between the North and Baltic seas by about 200 mi. and eliminated the difficult passage around Jutland (q.v.). It was internationalized by the Treaty of Versailles in 1919.

NORFOLK, politically independent city and seaport in Virginia, on Hampton Roads (q.v.) opposite Portsmouth. With the cities of Portsmouth and Newport News it forms the Port of Hampton Roads, one of the greatest natural harbors of the world; the waters of Norfolk and Portsmouth are collectively called Norfolk Harbor. Transportation facilities include seven railroads, a regional airport, bridge-tunnels, coastal inland waterways, and ocean steamship lines. Norfolk Harbor is connected with Chesapeake Bay by a channel 40 ft. in depth, and the city has 50 mi. of developed water frontage on Chesapeake Bay, Hampton Roads, and the Elizabeth and Lafayette rivers. In addition to warehouses, dry docks, and shipyards, modern piers line the

the most notable recreation areas in the State, including Ocean View, Virginia Beach, Seashore State Park near Cape Henry, and the Great Dismal Swamp, a famous hunting and fishing area. Norfolk is the site of several facilities of the United States government, of which the most important is the U.S. Naval Base, which includes a naval station, a supply depot, a naval air station, and a submarine base. The Norfolk Naval Shipyard, a U.S. Navy installation, is situated across the Elizabeth R. in Portsmouth. Other governmental agencies in Norfolk are the district headquarters of the U.S. Coast Guard, a branch of the U.S. Hydrographic Office, a U.S. District Court, a U.S. Public Health Service unit, and the headquarters of the Virginia customs district. The principal educational institutions in Norfolk are Old Dominion College, Norfolk State College, and Virginia Wesleyan College. Saint Paul's Church (Protestant Episcopal), built in 1739, the Myers House (1791), and General Douglas MacArthur Memorial are among the points of historic interest. Embedded in the walls of St. Paul's is a British cannonball. Norfolk is governed by the council-city manager system.

Commerce and Industry. Norfolk is a leading commercial and manufacturing center. The chief exports are coal, tobacco, cotton, truck garden crops, and oil. The city also has an extensive trade in peanuts, oysters, grain, cornstarch products, and fruits. Among the industrial establishments, in addition to extensive shipbuilding yards, are flour mills, grain elevators, breweries, cottonseed-oil and peanut-oil mills, silk mills, lumber mills, meat-packing plants, automobile assembly plants, railroad repair shops, foundries, fisheries, and factories producing chemicals, fertilizers, peanut candy, beverages, cotton bagging, clothing, hosiery, mattresses, springs, barrels, cement, and machinery.

History. Norfolk was laid out in 1682 and incorporated as a borough in 1736. It was an important center of trade with England and the West Indies until the American Revolution, when it was bombarded by the British fleet on Jan. 1, 1776, and later burned by Virginia militia to prevent its occupation by the British. The rebuilt town was attacked unsuccessfully by the British in the War of 1812. The city of Norfolk was chartered in 1845. An epidemic of yellow fever in 1855 seriously retarded its development. During the Civil War the city was captured by Union forces in 1862. After the war Norfolk gradually developed in importance as a commercial, industrial, and naval center.

513. In 1960 the population was 304,869, and in 1970 it was 307,951.

NORFOLK, Great Britain, county of England bounded on the n. and e. by the North Sea, or the w. by Cambridgeshire, and on the s. by the county of Suffolk. Much of the level land near the coast has been reclaimed from the sea. Norfolk is chiefly an agricultural, stock-, and poultry-raising county. Textiles are manufactured. The principal rivers are the Ouse and the Yare. The county boroughs are Great Yarmouth and Norwich (qq.v.). Area, 2053 sq.mi.; pop. (1971) 616,427.

NORFOLK, earldom and later dukedom in the English peerage held by the highest-ranking member of the peerage, next in rank to princes of royal blood. The earldom of Norfolk was first held by the 11th-century knight Ralph de Guader (1040?-96), upon whom it was conferred by William I (q.v.), called the Conqueror. In 1075, when de Guader revolted against William, the title was declared forfeit. It was revived about 1136 when King Stephen (q.v.) awarded it to one of his early supporters, Hugh Bigod (1095-1177). After the death of Roger Bigod, 5th Earl of Norfolk (1245-1306), who was childless, the title was vacant. Six years later it was bestowed by King Edward II (q.v.) on his half brother Thomas of Brotherton (1300-38); The title was again vacant until 1397 when Thomas' daughter Margaret (d. 1399) was created duchess of Norfolk and her grandson, Thomas Mowbray, 12th Baron Mowbray (1366-99), was created 1st duke of Norfolk. The Mowbrays retained the title until the death of John Mowbray, 4th Duke of Norfolk (1444-76), when the dukedom fell vacant. In 1483 it was conferred upon John Howard (1430?-85), a grandson of Thomas Mowbray; the Howard (q.v.) family has retained the title until the present time.

NORFOLK ISLAND, island in the w. Pacific Ocean, situated about 400 miles n.w. of New Zealand. Formerly administered by the governor of New South Wales, it has been under the administration of the Australian Commonwealth since 1914. The coasts are high (mean altitude, 400 ft.) and steep, and the surface is generally uneven, rising in Mt. Pitt to 1039 ft. The island is 5 mi. long and has an area of 13½ sq.mi. Tourism and citrus fruits provide the major industries. The population is descended from mutineers of the British vessel the *Bounty* (q.v.). Pop. (1971) 1422.

NORMAL, town of Illinois, in McLean Co., on

NORMAL SCHOOLS

gion producing corn, fruit, and nursery products, the town manufactures tires, canned goods, building materials, and wood products. It is the site of Illinois State University (1857) and of the Illinois Soldiers' and Sailors' Children's School. First settled in the early 1800's, the community was called North Bloomington until the establishment of the State normal school; it was incorporated in 1867. Pop. (1960) 13,357; (1970) 26,396.

NORMAL SCHOOLS. See TEACHING AND TRAINING OF TEACHERS: *Teacher Training in the United States*.

NORMAN, city in Oklahoma, and county seat of Cleveland Co., 18 miles s. of Oklahoma City. The city is the commercial center of an agricultural and petroleum-producing area. Norman is the site of the University of Oklahoma; see OKLAHOMA, UNIVERSITY OF. Norman was settled in 1889 and chartered as a city in 1902. Pop. (1960) 33,412; (1970) 52,117.

NORMAN ARCHITECTURE. See ROMANESQUE ART AND ARCHITECTURE: *Architecture*.

NORMAN CONQUEST. See ENGLAND: *History*.

NORMANDY, region and former province of France, bordering on the English Channel. In area it corresponds approximately to the modern departments of Seine-Maritime, Eure, Orne, Calvados, and Manche; its former capital was Rouen. Normandy is an agricultural region known for its dairy industry.

Under Roman domination the region formed part of *Gallia Lugdunensis* (see GAUL). With the Frankish invasions it was made a constituent part of the kingdom of Neustria (q.v.). It came to be known as Normandy about 911 when Charles III (q.v.), King of France, turned it over to Rollo (860?-931?), the leader of a menacing band of Norman raiders; see NORSEMEN. In 1066 a descendant of Rollo, William II, Duke of Normandy, led an invasion of England and established himself there as William I (q.v.), King of England. Normandy remained an English possession until conquered in 1204 by Philip II (q.v.), King of France. During the Hundred Years' War (q.v.), the region was held at various times by both French and English forces; it was finally recovered by the French in 1449. The Channel Islands, which were once a part of Normandy, remained in the possession of England.

Normandy was the location of the Allied landing on Normandy Beach during World War II (q.v.).

NORMAN FRENCH, French dialect that developed in Normandy (q.v.) after Scandinavian

see NORSEMEN. In adopting French as a medium of communication the Normans retained for purposes of literary expression many Scandinavian words, which are still, though in a greatly changed form, characteristic of this French dialect; the largest such class is that of proper names of persons and places."

During the early period Norman French played a significant part in French literature (q.v.). Among the most important works written in the dialect are historical accounts, for it was in Normandy that histories in the vernacular first made their appearance. Geoffrey Gaimar (fl. 12th cent.), an Anglo-Norman poet and historiographer, wrote *Estorie des Engles* ("History of the English"), narrating the heroic achievements of the Anglo-Normans. Wace (q.v.), another 12th-century Anglo-Norman chronicler, wrote *Roman de Brut*, or *La Geste des Bretons* ("Heroic Achievements of the Bretons"), which was actually a lively translation into Norman French of *Historia Regum Britanniae* ("History of the Kings of Britain"), a Latin work by the English monk Geoffrey of Monmouth (q.v.). From 1160 to 1174, Wace produced *La Geste des Normands* ("Heroic Achievements of the Normans"), also called *Roman de Rou*, comprising 17,000 decasyllabic and octosyllabic lines. The chronicle was completed later in the century on the request of Henry II (q.v.), King of England, by a French troubador, Benoît de Sainte-Maure (q.v.), who added 43,000 octosyllabic lines in order to provide a fuller history of the Norman dukes.

During the three centuries after the Battle of Hastings in 1066, French culture dominated the English language and its literature. Norman French was the official language of polite society in England, where a considerable French literature was produced, both in poetry and prose. Among the most important works of the 12th century may be mentioned the *Cumpoz* and *Bestiaire* of the Norman poet Philippe de Thaün, the laws of William I (q.v.), King of England, called the Conqueror, and versions of the Alexis, Roland (q.v.), and Brandan legends, besides the *Chançon de Guillelme*, which probably belongs to the end of the 11th century. The 13th century was by far the most flourishing epoch. Among the poets belonging to this period are Adgar; Fantosme, who wrote a *Chronique* ("Chronicle") of the invasions of the Scots in 1173-74; Angier, author of a life of Saint Gregory the Great (see under GREGORY); Chardri; and Guillelme de Berneville, who wrote a life of Saint

Hampton (Boeve de Haumtone), Saint Auban, and others are the subjects of anonymous poems. Also of interest are versions of the *Pèlerinage de Charlemagne* ("Pilgrimage of Charlemagne"), and the mystery play of Adam, as well as a *Fabliau du Héron*. The 14th century, marking the decline of this literature, is noted for the *Contes Moralisesés* by the Anglo-Norman author Nicole Bozon and versions of various Biblical legends.

After the decline of Anglo-Norman literature French continued to be the language of pleadings in the law courts until as late as the mid-16th century. As argument was slowly differentiated from the mixed process of arguing and pleading, however, it began to be done in English. Subsequently, the precedence of the native tongue became greater and greater until by the end of the 18th century, law French had completely died out. W.F.

NORMANS. See NORMANDY; NORSEMAN.

NORRIDGE, village of Illinois, in Cook Co., about 12 miles N.W. of central Chicago. Primarily residential, the city has some manufacturing. Pop. (1960) 13,357; (1970) 26,396.

NORRIS, name of an American family of writers.

Frank Norris, in full BENJAMIN FRANKLIN NORRIS (1870–1902), novelist, born in Chicago, Ill., and educated at the University of California and Harvard University. He was a correspondent for the *San Francisco Chronicle* during the South African War (q.v.) and for *McClure's Magazine* during the Spanish-American War (q.v.). Norris' novels are brutally realistic, describing

and analyzing sordid human motives and environments; the influence of the French naturalistic novelist Émile Zola (q.v.) is strong. Norris' principal novels are *McTeague* (1899), a powerful story of the tragedy caused the lives of ordinary people by greed; a tale "The Epic of Wheat", depicting the human drama arising from the raising, selling, and consumption of wheat, of which two novels *Octopus* (1901) and *The Pit* (1903), were written; and a third, *The Wolf*, projected; and *Vandry and the Brute* (posthumously published, 1919), a story of degeneration. Others of his novels include *Moran of the Lady Letty* (1898), an action story; *A Man's Woman* (1900), a tale of erotic exploration; and *Blix* (1900), a semi-biographical love story.

Kathleen Norris (1880–1966), the wife of Charles Gilman Norris, born Kathleen Thomsen in San Francisco, Calif., and educated privately. She married Charles Gilman Norris in 1909. Kathleen Norris began her literary career in 1910 with the sale of short stories to magazines; her first novel, *Mother*, was published a year later. She is best known for her novels dealing with domestic American life and for her literary stories. Several of her novels were best sellers. Her novels include *Saturday's Child* (1914), *Story of Julia Page* (1915), *Sisters* (1919), *Certain People of Importance* (1922), *Second Hand Woman* (1932), *Heartbroken Melody* (1938), *The Violets* (1941), *Corner of Heaven* (1943), *The Secret of Hillyard House* (1947), *Shadow Marriage* (1952), *Miss Harriet Townshend* (1955), *A Thread Through a Glass Darkly* (1957). She is the author also of *Family Gathering* (autobiography, 1955). **Charles Gilman Norris** (1881–1945), writer and editor, the brother of Frank and the husband of Kathleen, born in Chicago, Ill. From 1908 to 1913 he was art editor of *American Magazine*. His writings, principally fictionalized studies of vital American industries, include *The Amateur* (1915), *Brass* (1921), *Bread* (1923), *P Iron* (1925), *Seed* (1930), *Zest* (1933), *Hancock* (1935), and *Brick Without Straw* (1938).

NORRIS, George William (1861–1944), American legislator, born in Sandusky Co., Ohio, and educated at Baldwin University (now Baldwin Wallace College) and the Northern Indiana Normal School. He settled in Furnas County, Nebraska in 1885, and entered the practice of law; from 1895 to 1902 he was judge of the 14th Nebraska District Court. From 1902 to 1913 he was a Republican member of the United States House of

Frank Norris

Bettmann Archive



NORRISH

ended the arbitrary rule of Speaker of the House in a House revolt against Joseph Gurney Cannon (q.v.). In 1912 Norris was elected to the United States Senate, and he was for some years a member of the Middle Western isolationist bloc that opposed the entry of the United States into World War I and later attacked the Versailles Treaty; see VERSAILLES, TREATY OF.

He favored Federal regulation of public utilities, and led a campaign that culminated in 1933 in the passage of the act that he wrote creating the Tennessee Valley Authority (q.v.; see also TENNESSEE; WATERPOWER). The first T.V.A. dam to be completed was named for him.

Among the other enactments sponsored by Norris are the Twentieth Amendment to the Constitution of the United States (q.v.), popularly known as the "Lame Duck" Amendment (q.v.); and the Norris-La Guardia Anti-Injunction Act of 1932, by which the issuance of injunctions in labor disputes was restricted. Norris' disregard for the limitations of party politics, exemplified by his support for many policies initiated under the New Deal (q.v.) program, eventually deprived him of the support of the Republican Party. In 1942, when he sought reelection as an Independent, he was defeated by the regular Republican candidate. Norris was the author of an autobiography, *Fighting Liberal* (published posthumously, 1945).

NORRISH, Ronald George Wreyford (1897–), British chemist, born in Cambridge, England, and educated at the University of Cambridge. He remained at Cambridge to teach for forty-two years, serving as director of the department of physical chemistry from 1937 until his retirement as professor emeritus in 1965. Norrish shared half of the 1967 Nobel Prize in chemistry with his protégé, the British chemist George Porter (q.v.). The other half was awarded to the German chemist Manfred Eigen (q.v.). The three scientists were cited for studies of high-speed chemical reactions.

NORRIS-LA GUARDIA ANTI-INJUNCTION ACT. See CLAYTON ANTITRUST ACT: INJUNCTION; NORRIS, GEORGE WILLIAM.

NORRISTOWN, borough in Pennsylvania, and county seat of Montgomery Co., on the Schuylkill R., 17 mi. n.w. of Philadelphia. A manufacturing center, its principal industries are foods and beverages, textiles, publishing, chemicals, electrical machinery and parts, plastics and fibers, mining and quarries, metal products, and leather and rubber products. Norristown is also

NORRKÖPING, city and seaport of Sweden, at the head of the Bråviken, an arm of the Baltic Sea, 75 miles s.w. of Stockholm. It is the chief textile-milling center in Sweden, with lumber and paper mills, shipyards, and manufacturing of rubber products, rayon, furniture, and margarine. Pop. (1971) 116,209.

NORSEMEN or **NORTHMEN,** or **VIKINGS,** sea raiders from Scandinavian regions whose voyages and conquests from about the 8th through the 12th centuries terrorized much of civilized Europe. Primarily, the Norsemen sought booty, first from weaker neighboring tribes and then in distant lands. Eventually, they established settlements at the mouths of European rivers and used them as bases for their ruthless plundering parties. Explorers and colonizers, as well as raiders, Norsemen groups sometimes settled in the conquered regions.

The Norsemen made their first recorded attack upon England in 787, after which they began to raid along the shores of the Frisian Islands, Flanders, and France. During the first half of the next century their depredations were more terrible than ever, especially in the Frisian Islands and Flanders. In 878 the Saxon king Alfred (q.v.) the Great finally drove the invaders from England. Charles III, King of France (see under CHARLES), however, was unable to defeat them, and in 911, he turned over to the Norseman leader Rollo (860?–931?) the duchy of Normandy (q.v.), named in the raiders' honor, as a feudal fief, on the condition that Rollo become his vassal and the fierce chieftain and his warriors be baptized as Christians. The Normans later became famous in history through a descendant of Rollo, William II, Duke of Normandy, who in 1066 invaded England and became King William I (q.v.).

In the 9th century, Norsemen ships also reached far to the southwest, establishing along the Irish coast the kingdom of Dublin; see IRELAND: *History: The Early Period*. The Faerøe, Orkney, and Shetland Islands seem to have been frequently visited by Norsemen after 825, and were permanently colonized during the next quarter of a century. Iceland was discovered and colonized by the same people between the middle and end of the century. From Iceland they ventured still farther west, settling Greenland and eventually visiting even Vinland (q.v.) in North America. In 1963 a team of Norwegian archeologists announced the discovery of a settlement near what is now L'Anse-au-Meadow,

indicated that the structures may have been built about the year 1000.

As early as 860 the Norsemen entered the Mediterranean Sea and founded kingdoms in lower Italy and Sicily. Three Scandinavian chiefs, brothers, of whom Rurik (d. 879) became the most influential, established themselves at Novgorod and laid the foundations of the kingdom of Gardariki, out of which grew the subsequent Russia; see *RUSSIA: Origins of the Russian People: The House of Rurik*. After the Russian ruler Vladimir I (956?–1015) introduced Christianity into his dominions in 988, the Scandinavian rulers surrounded themselves with warriors, known as Varangians, from the north; see *RUSSIA: Origins of the Russian People: The Decline of Kiev*.

NORTH, estuary of a river between the States of New Jersey and New York. See *HUDSON*.

NORTH, Christopher, pen name of JOHN WILSON (q.v.).

NORTH, Frederick, 2nd Earl of Guilford, known as LORD NORTH (1732–92), British statesman, born in London, England, and educated at Eton College and the University of Oxford. In 1754 he was elected a member of the House of Commons, where he served for almost forty years. He was appointed chancellor of the exchequer in 1767, and three years later became prime minister of Great Britain. In the latter post he was subservient to the wishes of George III (q.v.), King of Great Britain, carrying out measures for the taxation of the American colonies that he personally believed unwise. At the outbreak of the American Revolution in 1776, he advocated arranging an early peace; by 1779 he recognized the impossibility of a British victory over the Americans, but was persuaded by the king to support the war. In 1782, after the surrender of the British forces in America, he resigned. In the following year North formed a coalition with Charles James Fox (see *under* FOX), who had formerly led the Whig opposition to North's administration, and with whom he succeeded in overthrowing the ministry of William Petty, 2nd Earl of Shelburne (see *under* LANS-DOWNE). Thereafter, North was a member of the opposition to the ministry of William Pitt the Younger (see *under* PITT). He was created Earl of Guilford in 1790.

NORTH, John Ringling (1903–), American circus executive, born in Baraboo, Wis., and educated at the University of Wisconsin and Yale University. After leaving college, he sold

uncles owned the Ringling Brothers and B & Bailey Circus, was appointed president of the circus in 1937. He resigned that position but in 1947 he gained a controlling interest in the circus and once more became its president. In 1967 the circus was sold, but North remained with it in the capacity of producer.

NORTH ADAMS, city of Massachusetts, Berkshire Co., on the Hoosac R., in the foot of the Berkshires, about 50 miles N.W. of Springfield. North Adams is near the west end of the Hoosac Tunnel (1876), which extends for 4.5 miles under the Hoosac Mts., and the city is the terminus of the old Mohawk Trail. North Adams is a manufacturing center, producing mechanical and electrical components, chemicals, leather products, paper, and textile goods. A Massachusetts State College, founded in 1894, is located here. The city lies at the foot of Mt. Greylock (3500 ft. above sea level), the highest point in the state, and contains a natural bridge, about 55 ft. high, spanning Hudson Brook. On the west skirts of the city is a replica of old Fort Massachusetts, originally built in 1745. The site of the present city was settled in 1765 and was a part of Adams until 1878, when it was set apart and incorporated as a town. It was chartered as a city in 1895. Pop. (1960) 19,905; (1970) 19,195.

NORTH AMERICA, larger and northernmost of the two continents of the Western Hemisphere and the third largest (after Asia and Africa) of the earth. The most northerly point of the continental mainland lies on Boothia Peninsula, at about lat. 72° N.; the southernmost point, at the s.e. extremity of the Isthmus of Panama, lies at about lat. 7°15' N. The extreme E. W. limits of the continental mainland are delimited respectively by long. 55°42' W., which crosses the s.e. coast of the Labrador peninsula (see *LABRADOR*), and long. 168° W., which crosses the tip of Cape Prince of Wales (q.v.). In a north-south direction, the maximum length of the continental mainland is about 4500 mi. The extreme width, measured in an east-west direction, is about 3200 mi. The continent has the form of an irregular triangle, with the base to the N. and the apex in the S. It has an area of about 9,385,000 sq.mi., about 16 percent of the land area of the world; some 387,000 sq.mi. is inland water surface. The population (U.N. 1970) was 330,679,000.

North America is bounded on the N. by the Arctic Ocean and the Atlantic Ocean; on the E. by the Atlantic Ocean; on the S.E. by the Gulf

NORTH AMERICA

continental area, the Isthmus of Panama, is attached to South America; see PANAMA CANAL. Seward Peninsula, the westernmost portion of the continent, is separated from Asia by the Bering Strait, which is 56 mi. wide.

THE LAND

The coast of North America is deeply indented, particularly in the north, northwest, and northeast. Besides Hudson Bay (q.v.), major penetrations of the sea into the n. portion of the mainland include Beaufort Sea, an arm of the Arctic Ocean; Amundsen Gulf, an inlet of Beaufort Sea; the Gulf of Boothia, an arm of the Arctic Ocean; James Bay, an inlet of Hudson Bay; and Ungava Bay, an inlet of Hudson Strait. Important embayments in the n.w. are the Gulf of Alaska, Cook Inlet, Bristol Bay, Norton Sound, and Kotzebue Sound. The principal indentations on the n.e. and e. coast of the continent are the Gulf of Saint Lawrence, Bay of Fundy, Massachusetts Bay, New York Bay, Delaware Bay, Chesapeake Bay, Gulf of Mexico, Gulf of Campeche, Gulf of Honduras, and Mosquito Gulf. River estuaries, inlets, capes, and headlands are numerous on the n. and n.e. coasts of the continent, adding substantially to the broken character of the shoreline in these regions. In the s.w. and w., where the continental rim is considerably more regular, the chief embayments are the Gulf of Panama, the Gulf of California, San Francisco Bay, and Puget Sound.

The islands and island groups geologically or traditionally associated with the continent are numerous. Greenland (q.v.), which is almost continental in area, is the largest island in the world. Among other major North American islands are Baffin Island, a part of which lies beyond the Arctic Circle; Ellesmere, Victoria, Banks, Devon, and Prince of Wales islands, each of which is situated beyond the Arctic Circle; Newfoundland, Anticosti Island, Prince Edward Island, Cape Breton Island, and Long Island, which are off the e. coast; and Vancouver Island and Kodiak Island, off the n.w. coast. In addition to the West Indies (q.v.) important island groups or archipelagoes are the Bahamas and the Bermuda Islands, off the e. coast, and off the w. coast, Queen Charlotte Islands, Alexander Archipelago, and Aleutian Islands.

Physical Characteristics. Five major physiographic regions are distinguishable on the mainland of North America, namely, the Cordillera (q.v.), a vast system of mountain ranges, parallel to the Pacific coast and extending from n. Alaska southward beyond Mexico; a plains region, known as the Great Plains, extending through the central part of the continent from the Arctic

Ocean nearly to the Gulf of Mexico; the Appalachian Mts. (q.v.), a lesser mountain system, rising on the e. edge of the plains region and extending from Newfoundland southward to central Alabama; the Laurentian Highlands (see CANADIAN SHIELD), an ancient, heavily eroded uplift occupying most of the continental area n.e. of the plains region; and the Atlantic Coastal Plain, chiefly consisting of lowlands between the Appalachians and the Atlantic Ocean and of the lowlands that are adjacent to the Gulf of Mexico.

The Cordillera develops its greatest breadth and complexity in the United States. In the U.S. it includes a broad plateau 1000 mi. in width, with an elevation of 5000 to 10,000 ft., broken by many deep canyons, arid, undrained depressions, and a succession of mountain ranges. The Rocky Mts. (q.v.), the most massive system of these ranges, extend from n.w. Canada to the Mexican frontier. The system attains its highest elevation in Colorado, rising to altitudes about 14,000 ft.; Mt. Elbert, 14,433 ft., the highest peak in the Rockies, is in the Sawatch Range, in Colorado; Mt. Robson, 12,972 ft., is the highest peak of the Rockies in Canada.

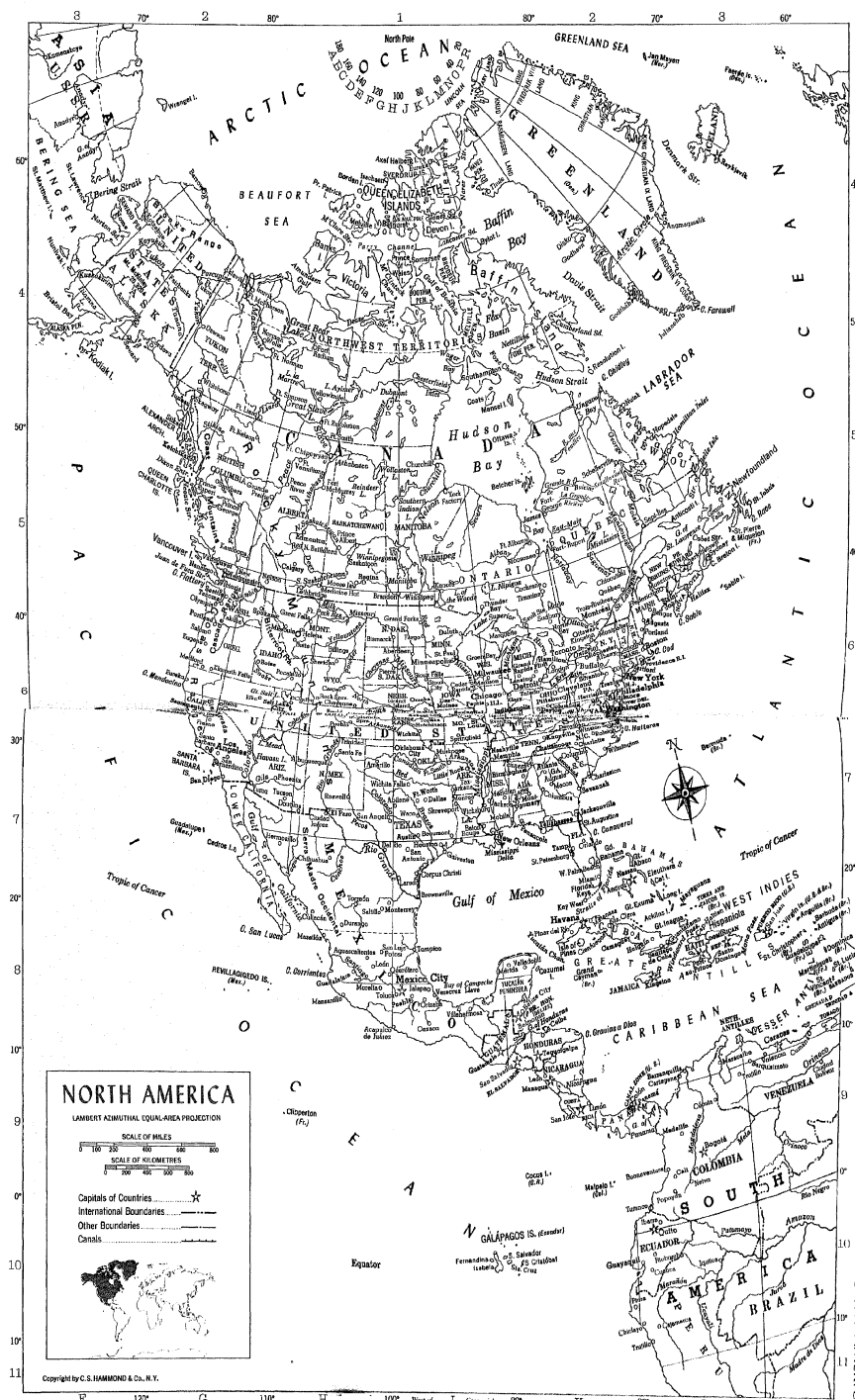
In California, parallel to the Rockies, is the Sierra Nevada (q.v.), the second-largest system of the Cordillera, with Mt. Whitney, 14,494 ft.; Mt. Shasta, an extinct volcano, 14,162 ft.; and Mt. Langley, 14,042 ft. The Cascade Range of Oregon, Washington, and British Columbia is a continuation of the Sierra Nevada in direction, though not in structure, as it is in the main a product of volcanic action and contains many extinct volcanoes, the highest of which is Mt. Rainier, 14,410 ft. Northward in British Columbia the system is neither so high nor so broad, but following the coast through Alaska, it rises in semidetached groups and ranges, some of great height, culminating in Mt. McKinley, 20,320 ft., n. of Cook Inlet, the highest summit in North America. On the boundary between Alaska and Canada is Mt. Logan, 19,850 ft., the second-highest peak of the continent.

Mexico, with the exception of the Yucatán Peninsula, lies almost entirely within the Cordilleran mountain system. The plateau extends southward into it from the U.S., with an elevation ranging from 3700 to 9000 ft. Upon this undulating tableland, known as the Mexican Plateau, are many mountain ranges and active or dormant volcanoes, the latter being the highest peaks of the country. Among them are Citlaltépetl, 18,855 ft.; Popocatepetl, 17,887 ft.; and Iztaccihuatl, 16,883 ft. In Central America the Cordillera is represented by detached ranges of hills

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with numerous volcanic peaks, of which some are active and others extinct.

The plains region *e.* of the Cordillera, with a maximum breadth of 25° of longitude, consists mainly of semiarid hills, peneplains, and prairies. The only uplift of importance in this area is the Ozark Plateau in Arkansas and s. Missouri, with an elevation of 2000 to 3000 ft.

The Appalachian Mts. are a fairly continuous system from 100 to more than 300 mi. wide and from 1500 to 3000 ft. high. The easternmost range of the system is the Blue Ridge and the westernmost is the Allegheny Mts. In the *n.* are the Green Mts. and White Mts. of Vermont and New Hampshire, which differ in their geological structure from the central and s. portions of the system. Several peaks of the Appalachians exceed 6000 ft. Mount Mitchell in North Carolina, which is the highest point in the system, reaches an altitude of 6684 ft. The *e.* Appalachian foothills, which slope gently to the Atlantic

Autumn comes to New England, producing a spectacular display of foliage color that brings tourists in large numbers to the Northeast.

Rapho-Photo Researchers

Coastal Plain, are known as the Piedmont Plateau.

Rivers and Lakes. The greater part of North America is drained into the Atlantic Ocean and the Gulf of Mexico. Extensive areas, however, mainly in the *n.* and Cordilleran regions, are drained into the Pacific and Arctic oceans. The Pacific drainage basin includes all of the continent *w.* of the Continental Divide (see *GREAT Divide*), the maximum Cordilleran contour line, which extends through the Rocky Mts. across the plateau of Anáhuac and Central America. The chief streams of the Pacific drainage basin are the Colorado, Sacramento, San Joaquin, Columbia, Fraser, and Copper rivers. Most of Alaska and much of the Yukon region of Canada are drained by the Yukon R. into the Bering Sea. The *n.* part of the great central depression of the

NORTH AMERICA

continent drains into the Arctic Ocean by the Mackenzie and Coppermine rivers. Farther s. the land is drained to Hudson Bay by the Nelson and other rivers, and to the Atlantic directly by the Great Lakes (Superior, Michigan, Huron, Erie, and Ontario) and the Saint Lawrence R. The waters of the s. portion of the central depression are collected by one of the greatest rivers of the earth, the Mississippi, with its branches, the Ohio, Missouri, Arkansas, and Red rivers, and are carried to the Gulf of Mexico. The e. slope of the Appalachian mountain system is drained to the Atlantic Ocean by the Connecticut, Hudson, Delaware, and many small rivers.

Besides the Great Lakes, many other large bodies of water are situated in North America. In Canada are Great Bear, Great Slave, and Athabasca lakes, belonging to the Mackenzie R. system; lakes Reindeer, Winnipeg, Manitoba, and Lake of the Woods, which are drained to Hudson Bay, and Lake Nipigon, tributary to the St. Lawrence R. system. In the northern U.S. are thousands of small lakes, which, in common with those of Canada, were formed by the Laurentian glacier. In the Cordilleran region are many lakes, some of glacial origin, such as Pend Oreille and Flathead, and others of volcanic origin, such as Yellowstone Lake. A number of the Cordilleran lakes occupy desert valleys and have no outlet, such as Great Salt, Carson, and Walker lakes.

Geology. The oldest part of the continent, the first to be elevated above the sea, is the n.e. section, including the Adirondacks of New York, the Laurentian Highlands of Canada, a region around the Great Lakes, and a southward projection e. of the Blue Ridge in the Southern States. This section comprises the Archean area. From it, as a nucleus, the continent grew westward, as is indicated by the surface formations, which become successively more recent. The e. portions of the Appalachians are in great part composed of Silurian beds. The plateau forming the w. part of the system is Carboniferous. This formation also underlies much of the Mississippi valley. The plains which form the eastward slope of the Cordilleran plateau are floored, in westward succession, by Triassic, Cretaceous, and Tertiary beds.

The mountains of the Cordilleran system, mainly of recent formation, show strata of all ages, as they have been much disturbed by uplift and the beds exposed by subsequent erosion. Upon the mountains granitic rocks predominate, as the stratified beds which formerly covered them have been eroded away, while in

many instances these stratified beds remain on the flanks of the ranges as hogback ridges. The valleys are often partially filled with detritus from the mountains. In this region many areas have been covered by outflows of lava, some in recent times. The regions bordering the coasts of the Atlantic and the Gulf of Mexico are floored with Cretaceous and Tertiary deposits, indicating their comparatively recent uplift. No continuously active volcanoes are found in the U.S. proper or in Canada. The third-greatest volcanic belt in the world is in Alaska, extending westerly from Mt. Wrangell (14,163 ft.) for 1600 mi. Numerous violent eruptions have occurred in this field. In Mexico, Central America, and the West Indies there are many active volcanoes.

Climate. Most of North America lies within the North Temperate Zone, with only its lower apex extending into the Torrid Zone. Thus, moderate temperatures prevail throughout a great portion of the continent. The main body of North America is principally within the region of the antitrades or prevailing westerlies. These winds give to the w. coast of the U.S. and Canada and to s.e. Alaska an insular climate, with general uniformity of temperature and heavy rainfall. The influence of the antitrades extends inland only to the w. slopes of the Sierra Nevada-Cascade mountain system. The remainder of the U.S. and Canada has a continental climate, with much greater extremes of temperature. Central America lies within the region of the trade winds and has an insular climate owing to the narrowness of the land.

The mean annual temperature ranges from a high of 80° F. in Central America to a low of 5° F. on the Arctic coast, and except on the Pacific coast the temperature decreases regularly with the latitude. In midwinter (January) the temperature ranges from 80° F. in the s. to -25° F. on the Arctic coast. The reduction with increasing latitude is much less on the Pacific coast than in the interior or on the Atlantic coast. The coast of s. Alaska is 30° warmer than that of Labrador in approximately the same latitude. Midsummer (July) temperature is highest on the arid plateau of n. Mexico and in s. Arizona, where it reaches 95° F. Thence it diminishes in all directions, sharply to the w. as the Pacific coast is neared, and much more gradually northward and eastward. The range of summer temperature between San Diego, Calif., and the Aleutian Islands is only 20° (from 70° to 50°), while in the e. part of the continent its range is from 80° to 40°, and in the Cordilleran region from 95° to 40°. In this latter region extreme heat as well as extreme cold is frequently encountered. In s. Ar-

izona summer temperatures of 120° F. have been recorded. Temperatures of 100° F. have been recorded as far N. as lat. 60°. On the Pacific coast the range of temperature between midsummer and midwinter is only 20°; on the Atlantic coast it is nearly twice as great, and in the Cordilleran region, three times as great.

The distribution of rainfall over North America depends upon the configuration and relief of the land and on the direction of the winds. In the region of the trade winds the rainfall is heavy, frequently exceeding 80 in. annually in parts of Central America and diminishing northward. In the region of the antitrades the Pacific coast receives nearly all the moisture brought by these winds from the Pacific Ocean, and the amount and distribution of rainfall are radically affected by the relative temperatures of land and sea. Where and when the land is colder than the sea, moisture is condensed from the air currents and falls in rain; the rainfall is therefore heavy on the N. part of this coast and light on the S. part, and is heavy in winter and light or entirely absent in summer.

At San Diego, Calif., the rainfall is light, while at Puget Sound it averages from 75 to 100 in. annually; along the Alaskan Pacific coast the annual average is 80 in., most of which falls in winter. Air currents from the Pacific, deprived of most of their moisture in passing over the mountain ranges near the Pacific coast, flow over the Cordilleran region most of the year as dry winds. In the summer, however, the winds retain a little moisture, which is deposited on the high ranges of the Cordilleran interior. Hence, this region, which is mainly desert, or semidesert receives 20 in. or less of rain in the summer.

Moving eastward, this general air movement, taking the form of great cyclones or anticyclones, draws air currents from all directions. Air currents flowing from the Gulf of Mexico are saturated with moisture and, cooling as they move northward, give rain to the land (*see CYCLONE*). Thus the great depression of the continent is watered in the main from the Gulf of Mexico, the annual rainfall ranging from 60 in. on the coast to 30 in. in the region of the Great Lakes and Hudson Bay. As the cyclonic disturbances approach the Atlantic Ocean, saturated air currents are drawn to the Atlantic Coastal Plain. Precipitation in this region ranges between 45 and 60 in. annually.

Natural Resources. North America is abundantly endowed with natural resources. Among the rich deposits of metallic ores located in the W. sections of the continent are gold, nickel,

platinum, and uranium. Iron deposits are located in the Canadian Shield, one of the richest stores of minerals in the world. Major silver deposits are located in Mexico, and copper is found in the western U.S. The Appalachian section is noted for its coal, but it also has deposits of petroleum, natural gas, gold, and mica. The Gulf and Atlantic coastal plains produce important quantities of sulfur, phosphate, and petroleum. Other ores located in the continent include lead and zinc, as well as bauxite.

In addition to the rich mineral resources, the continent has a fertile grassland region in the central plains. Although wasteful exploitation has destroyed much of the virgin wealth of the area, governments have undertaken many measures to conserve remaining natural resources.

PLANTS. The flora of North America, ranging from arctic to tropical varieties, is extremely rich and varied. In the barren lands or tundra (q.v.) of N. Canada and Alaska, where the subsoil is permanently frozen, plant life consists chiefly of grasses, mosses, and arctic willows; but in the short hot summers of this region, even the tundra is gay with bright-colored blossoms. Near the Arctic Circle are forests of spruce, with some birch and alders, and southward as far as the North Saskatchewan R. in Canada, the land is forested with spruce, pine, fir, and hemlock. This timbered area extends along the Pacific coast nearly to San Francisco Bay. In Washington, Oregon, and California exist probably the heaviest forests in the world, consisting almost entirely of ponderosa pine, cedar, hemlock, Douglas fir, sugar pine, and two species of the sequoia (q.v.).

Eastern Canada and the U.S. are forested, the W. limit including most of Minnesota, Wisconsin, and Indiana, S. Missouri, and N.E. Texas. In this region the prevalent species are deciduous, but dense stands of conifers occur in various areas. Yellow pine is the dominant species in the S.E. portion of the U.S. West of the eastern forested region in the U.S. and Canada are the fertile prairies, a highly cultivated region which originally supported grasses, shrubs, and scattered groves of timber. The prairies gradually merge with the treeless plains which form the E. slope of the Cordilleran plateau.

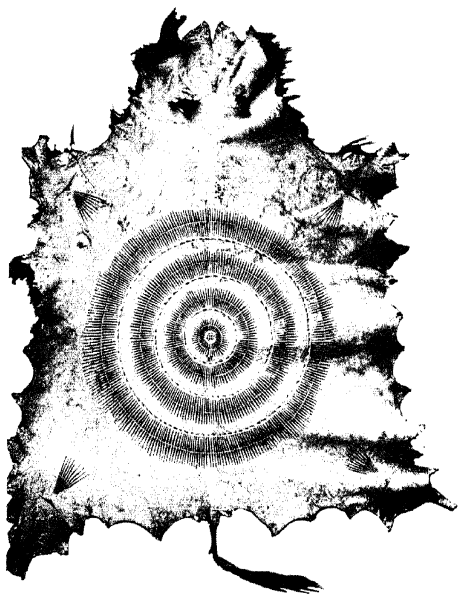
In the Cordilleran region forests are found generally only on the mountains. The valley vegetation depends upon the degree of aridity; here may be found grass, artemisia, cacti, yucca, and other thorny desert shrubs, which in some localities grow so densely as to form chaparral. From N. Texas across New Mexico, Arizona, S. Colorado, and S. Utah, on mesas and the lower

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hills and mountains, occur the piñon (*Pinus edulis*) and the juniper. The n. plateau region of Mexico is without forests, except upon the higher ranges. Luxuriant tropical vegetation, including many species of fruit trees, is characteristic of the s. part of the country and Central America; see PLANTS, GEOGRAPHICAL DISTRIBUTION. ANIMALS. The fauna of North America is similar to that of the n. zones of the Old World. Among mammals are numerous species of bear and varieties of wolf, the lynx, the bison, caribou, moose, bighorn, white goat, beaver, the majority of the rodents, and small insectivores and bats. The mammals peculiar to North America include the puma, the skunk, the pronghorn, the musk ox, and certain rodents, such as the pouched rats and sewellel (a burrowing rodent similar to the marmot). Of marsupials a single form, the opossum, is to be found. The birds present a similar parallelism with n. Europe and Asia, and the same is true of reptiles and amphibians, which are marked in North America by the preponderance of certain subordinate forms, such as rattlesnakes. Fishes present somewhat greater distinctions; yet the bulk of freshwater fish are similar to those of the colder parts of Europe. Insects and freshwater mollusks seem

An example of 19th-century abstract art by Sioux Indians of North America, painted on buffalo hide.

Museum of Primitive Art



generally related to those of Europe and Asia. The U.S., however, is richer than any other part of the world in fluviatile mollusks, especially river mussels; see ANIMALS, GEOGRAPHICAL DISTRIBUTION OF.

WATERPOWER. North America, which has more lakes than any other continent, is well supplied with sources of hydroelectric power. The U.S. and Canada rank first and second in the world in waterpower potential. Approximately 72 percent of the waterpower potential of the U.S. is in the area w. of the Great Plains. Three States, Oregon, Washington, and California, are estimated to have almost 50 percent of the waterpower potential of the U.S. The Canadian Shield is the largest potential source for waterpower in Canada, followed by the mountains and rivers of the w. Cordilleras.

The undeveloped waterpower potential of the U.S. in the mid-1960's was about 125,000,000 kw and of Canada about 65,000,000 kw, according to the latest available statistics. Mexico is also well endowed with power resources, with an estimated potential of 7,300,000 kw a small part of which has been developed.

THE PEOPLE

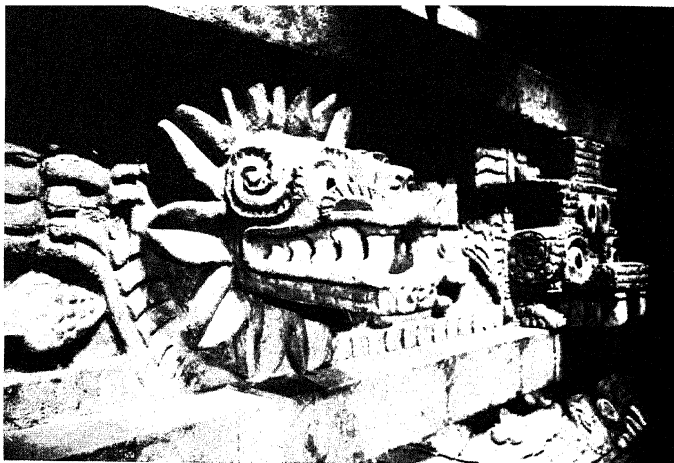
Little is known of the origins of the inhabitants of North America before the settlement of the area by the Europeans. Although many theories exist, evidence continues to support the belief that bands of hunters from Asia entered the continent across a land bridge that existed where the Bering Strait now separates Asia and Alaska. These first Americans arrived between 20,000 and 30,000 years ago, at the time of the last Ice Age. See AMERICAN INDIANS.

The majority of the people of North America are descended from Europeans. Of the population of Canada, only slightly more than 1 percent are Eskimo or American Indian. Of the remainder about 44 percent are descended from the British and 30 percent from the French. In the s. portion of the continent, the Spanish influence is evident. Nearly 90 percent of the population of the U.S. are classified as white and about 10 percent are classified as Negro; a small number are of Oriental or mixed ancestry. The population of the lower continent consists of American Indians, descendants of Europeans, Negroes, and people of mixed ancestry. American Indians constitute more than 50 percent of the population of Central America; the West Indies are predominantly Negro.

According to the latest available statistics, about 9 percent of the world population lives in North America. The distribution is uneven, however, with more than four fifths of the U.S.

Guarding the Quetzalcoatl temple at Teotihuacán, not far from Mexico City, is this rock-hewn feathered serpent, an emblem characteristic of the arts of the Mexican people.

Aerónaves de México



population living in the e. portion of the U.S., one of the most populated sections of the world, and about two thirds of the Canadian population living in the s.e. part of Canada. The remainder of Canada and the w. half of the U.S., except for portions of the coastal areas, are very sparsely populated. The population of Canada and the U.S. is about 75 percent urban; Mexico is about 60 percent rural.

Political Divisions. In political geography the continent consists of eleven sovereign nations, six independent states within the Commonwealth of Nations, and various holdings of four European nations. The sovereign nations on the continental mainland are, in descending order of size, the U.S., Mexico, Nicaragua, Honduras, Guatemala, Panama, Costa Rica, and El Salvador. Situated in the s. portion of the continent, the region occupied by the last six of these nations is commonly designated Central America (q.v.). The remaining three sovereign North American nations, namely Cuba, the Dominican Republic, and Haiti, are insular countries, situated in the West Indies. The independent states within the Commonwealth of Nations are Canada, which is the largest North American country in area, and the Bahamas, Barbados, Grenada, Jamaica, and Trinidad and Tobago, which are insular states in the West Indies. Greenland is an integral part of the Danish kingdom. Puerto Rico, one of the islands of the West Indies, is an autonomous commonwealth of the U.S. The Panama Canal Zone, a strip of leased Panamanian territory, and part of the Virgin Islands, situated in the West Indies, are possessions of the U.S. The principal British possessions in North America are British Honduras (Belize) on the mainland, Bermuda, and various West Indies islands. The other European nations with territory in North America are France, which administers Saint Pierre and Mi-

quelon, small islands off Newfoundland, and Guadeloupe, Martinique, and a few smaller islands, in the West Indies; and the Netherlands, which holds the Netherlands Antilles. The Netherlands Antilles and Trinidad and Tobago, part of the West Indies, have occasionally been classified as islands of South America. The following table lists the political entities of North America; each of the entities listed is the subject of a separate article.

CHIEF POLITICAL DIVISIONS OF NORTH AMERICA

Political Unit	Political Status
Bahamas	Independent state within the Commonwealth of Nations
Barbados	Independent state within the Commonwealth of Nations
Bermuda	British dependency
British Honduras (Belize)	British dependency
Canada	Independent state within the Commonwealth of Nations
Cayman Islands	British dependency
Costa Rica	Republic
Cuba	Republic
Dominican Republic	Republic
El Salvador	Republic
French West Indies	
Guadeloupe and dependencies	French overseas department
Martinique	French overseas department
Greenland	Integral part of Denmark
Grenada	Independent state within the Commonwealth of Nations
Guatemala	Republic
Haiti	Republic
Honduras	Republic
Jamaica	Independent state within the Commonwealth of Nations
Leeward Islands, British	Two British associated states and three British dependencies
Mexico	Republic
Netherlands Antilles	Integral part of the Netherlands
Nicaragua	Republic
Panama	Republic
Panama Canal Zone	U.S. lease territory
Puerto Rico	Autonomous commonwealth of U.S.
Saint Pierre and Miquelon	French overseas territory
Trinidad and Tobago	Independent state within the Commonwealth of Nations
Turks and Caicos Islands	British dependency
United States of America	Republic
Virgin Islands	U.S. territory
Windward Islands, British	Three British associated states

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HISTORY

Greenland, geologically a part of North America, was the first portion of the continent to be reached by Europeans. According to Icelandic sagas, North America was first discovered by Bjarni Herjólfsson in 986 A.D. The first European to discover any part of the continental mainland was probably the Norse mariner Leif Ericson (q.v.). About the year 1000 Ericson made a voyage to a land that he called Vinland, believed by historians to have been a locality on the coast of either Labrador, Newfoundland, or New England. This theory was partially substantiated by the discovery in 1963 by a team of Norwegian archeologists of a settlement site at L'Anse au Meadow, Newfoundland, which was determined to be of the Viking era. Subsequently Yale University Press published in 1965 the *Vinland Map*, supposedly dating from about the 1440's, but the authenticity of the map has since been placed in doubt.

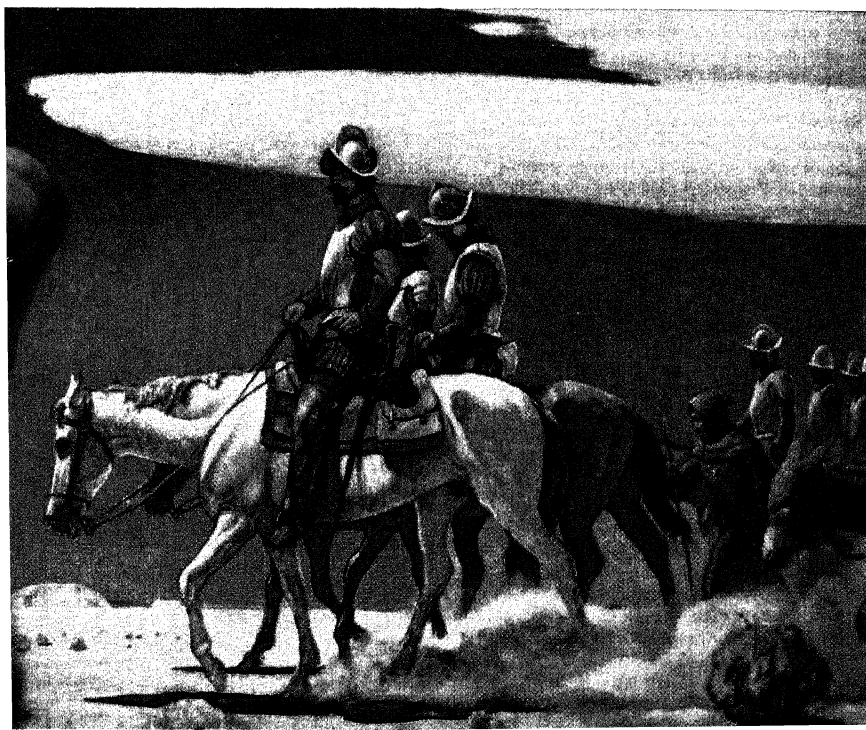
Age of Exploration. Consecutive discovery and exploration in North America began with

the voyage made in 1492 by Christopher Columbus (q.v.), a Genoese-born navigator in the service of Spain. His three small ships sailed from Palos, Andalusia, on Aug. 3, and on Oct. 12 reached San Salvador (Watling Island) in the Bahamas. Before returning to Europe Columbus also discovered Cuba and Hispaniola (q.v.). On the latter island he established the first Spanish settlement in the Americas.

Columbus made three additional voyages between the years 1493 and 1502, during which he made further discoveries in the West Indies and also coasted along Central America from Cape Honduras to a point near present-day Colón. In 1497 the Italian navigator John Cabot (*see under* CABOT), in English service, discovered Cape Breton Island; and in 1498, coasted along Labrador, Newfoundland, the New England coast, and also possibly as far south as Delaware Bay. The Portuguese navigator Gaspar Corte-Real (q.v.) made a voyage in 1500 to the North American coast between Labrador and the Bay of Fundy. In the same year the coast of Central America was explored by the Spanish explorers Rodrigo de Bastidas (b. 1460?) and Vasco Núñez de Balboa (q.v.), and in 1506 by the Spanish navigators Juan Díaz de Solís (about 1470–1516) and

An artist's conception of Francisco Coronado, a 16th-century Spanish explorer, leading an expedition in search of the fabled Kingdom of Quivira in the Midwest.

Bettmann Archive





"The First Sermon Ashore", a romantic depiction of Plymouth Colony in 1621 by J. L. G. Ferris. About half of the settlers died during the first winter.

Bettmann Archive

Vincente Yáñez Pinzón (see under PINZÓN). In 1509 Spanish settlers from Hispaniola, under the leadership of the explorer Alonso de Ojeda (1465?–1515), organized a colony in Darien (later Isthmus of Panama). Spanish soldiers under Diego Velásquez conquered Cuba by 1516; and in 1513 Juan Ponce de León (qq.v.), Spanish governor of Puerto Rico, discovered Florida. The year 1513 is also noted for the discovery of the South Sea (Pacific Ocean) by Balboa after a difficult march across Darien. Four years later the Spanish soldier Francisco Fernández Córdoba (d. 1518) discovered Yucatán, and in 1518 Juan de Grijalva (1489?–1527), a nephew of Velásquez, explored the eastern coast of Mexico, which he called New Spain. In 1519 the Spanish conquistador Hernando Cortes (q.v.) invaded Mexico, which he conquered during the next two years.

Spanish Conquests. Spanish conquest of the southern portion of the continent was substantially facilitated by the strife prevailing among the native peoples of the region. Internal turbulence had been especially acute in the Aztec (q.v.) Empire, the rich domain that fell to Cortes in 1521. In many respects the culture of this people, numerically and politically the most

powerful in North America, transcended that of the invaders. The Aztecs, however, were hated by many of the tribes under their sovereignty, and some of these tribes became willing allies of Cortes. Through this circumstance and superiority in weapons, Spanish victory was assured. The Maya (q.v.), another great Mexican people, living mainly on the Yucatán Peninsula, were disunited also and incapable of offering effective resistance to the Spanish. Although tens of thousands of natives of Mexico and Central America were exterminated during the period of Spanish conquest and rule, the Aztec, Maya, and various other tribes survived and multiplied. Their descendants comprise a large majority of the present-day population of these areas. See also AMERICAN INDIANS; GUATEMALA; HISTORY; LATIN AMERICA; MEXICO: History.

The region now known as Baja California was discovered by Cortes in 1536. Among other important Spanish leaders of exploring expeditions during the first half of the 16th century were Pánfilo de Narváez (1480?–1528) and Álvaro

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Núñez Cabeza de Vaca, who explored parts of Florida, the northern and eastern coasts of the Gulf of Mexico, and parts of northern Mexico between 1528 and 1536; Hernando de Soto, who discovered the Mississippi R. in 1541; and Francisco Vázquez de Coronado (q.v.), who explored large areas in the southwestern part of the present-day U.S. between 1540 and 1542.

By 1600 the Spanish had subjugated the natives of the larger West Indian islands, of the Florida peninsula, of southern New Spain, and of Central America. For administrative purposes the colonies founded by the Spanish in these areas were grouped in the viceroyalty of New Spain. After consolidating their control of New Spain, the Spanish authorities gradually pushed northward, completing the conquest of Mexico and taking over large areas in the south of what is now the United States. The colonial policy of Spain in North America was identical in all important respects with its South American colonial policy, that is, ruthless economic exploitation. Regarding the colonies merely as a source of wealth, the Spanish rulers imposed confiscatory taxation and maintained a monopoly of colonial trade. The Spanish government even forbade commercial intercourse among its American colonies. This oppressive economic policy and a concomitant political tyranny created among the Latin Americans a spirit of discontent that finally flared into open rebellion.

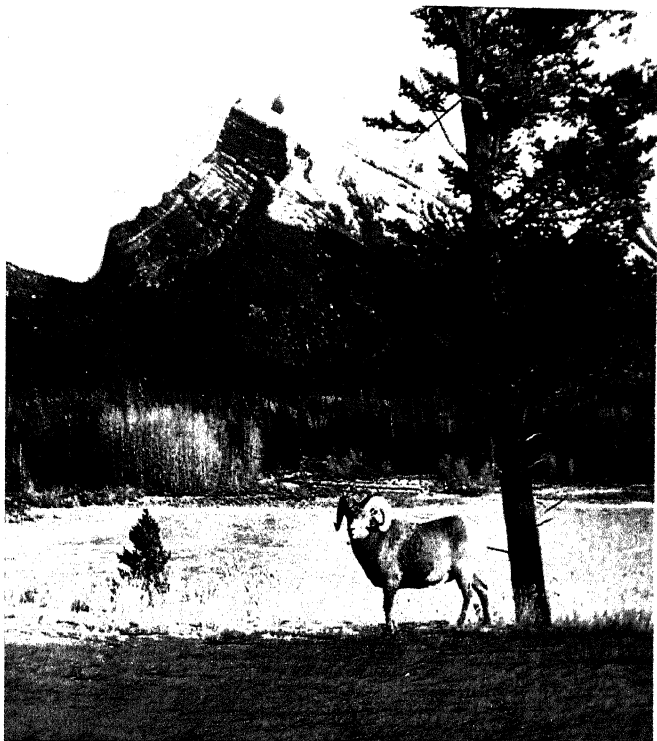
French and English Colonization. While Spain was consolidating its position in southern North America, France and England explored and settled the continent from Canada southward. England and Spain had been generally allied in international politics during the early part of the 16th century, and as a result the English did not then attempt to compete with Spain for territory on the continent. France, the chief rival of Spain for hegemony on the European continent, entered the race for colonial empire somewhat belatedly, but its territorial acquisitions in the New World were nonetheless important. In 1524 the Florentine navigator Giovanni da Verrazano (q.v.), sailing in French service, followed the North American coast from Cape Fear northward to a point usually identified as Cape Breton. In the course of this voyage he discovered what are now Narragansett and New York bays. In three voyages between 1534 and 1542 the French explorer Jacques Cartier (q.v.) discovered the Gulf of Saint Lawrence, the St. Lawrence R., and the Indian village that later became the site of Montréal. France claimed most of the northern part of the continent on the

basis of these discoveries. Because of domestic turmoil resulting from the Protestant Reformation, the French were forced to suspend colonial activity for more than half a century. Beginning in 1599, they established fur-trading posts along the St. Lawrence R. Numerous French Jesuit priests came thereafter to the St. Lawrence region, seeking to convert the Indians to the Roman Catholic faith, and various French explorers found and claimed for France new and widely separate sections of the continent. Among the most notable of these explorers were Samuel de Champlain (q.v.), who founded Québec in 1608, and explored what is now northern New York; the Jesuit missionary Claude Jean Allouez (1622–89), who opened up new territory about Lake Superior; and the Jesuit missionary Jacques Marquette and the explorer Louis Jolliet (q.v.), who in 1673 together explored the upper Mississippi R. as far south as present-day Arkansas. One of the most noted French pioneers in North America was Robert Cavalier Sieur de la Salle (q.v.), who in 1682 navigated the Mississippi from its junction with the Ohio R. to the Gulf of Mexico. In the name of France he took possession of the entire Mississippi valley, naming it Louisiana after Louis XIV (q.v.), King of France.

The English crown laid claim to the North American continent on the strength of the Cabot voyage of 1497–98, but for nearly a century made no attempts at colonization. The earliest English colony in North America was established in 1583 at Saint John's, Newfoundland, by the English navigator and soldier Sir Humphrey Gilbert (q.v.), but the settlers returned to England the same year. The first permanent British colony on the continent was Jamestown (q.v.), which was established in Virginia in 1607. In 1620 Plymouth Colony (q.v.) was founded on the shores of Cape Cod Bay, and Massachusetts Bay Colony was established between 1628 and 1630 on the shores of Massachusetts Bay. After 1630 the English systematically colonized the entire Atlantic seaboard between French Acadia (q.v.) and Spanish Florida. In addition, in 1664 the English annexed the Dutch colony of New Netherland, founded in 1613, which they renamed New York, and the settlements on the Delaware R. which the Dutch had seized from Swedish colonists in 1655. The English colonies grew rapidly in population and wealth. For details see UNITED STATES OF AMERICA: *History: Colonial Development*.

At the beginning of the last decade of the 17th century, most of the North American continent from Canada to the Gulf of Mexico was oc-

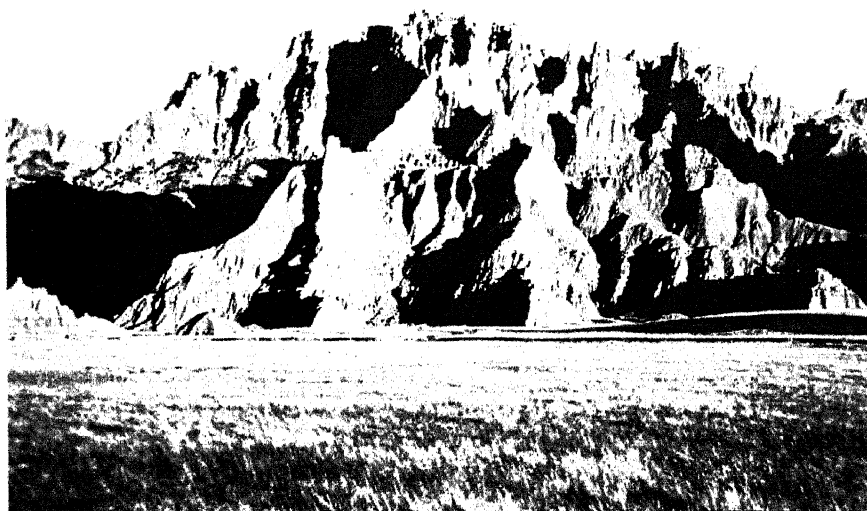
North America. Plate 1.
Right: View of Mt. Rundle, near Banff, in the Province of Alberta, Canada. The 9838-ft. peak was named for Robert Terrill Rundle, a 19th century British missionary. Below: Mount McKinley, the highest peak in North America, in the Alaska Range of the Rocky Mts. Its ice-capped summit is 20,320 ft. above sea level.



Canadian Consulate



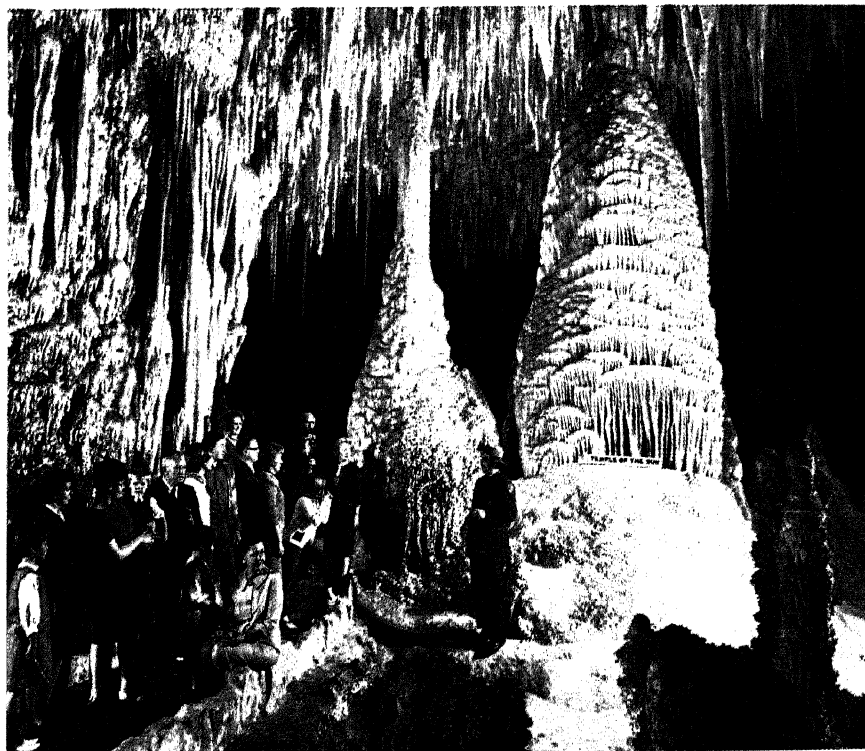
National Park Service



Badlands Natural History Assn.

North America. Plate 2. Above: The Badlands of North Dakota display fantastically shaped rock masses forming sheer cliffs and precipitous valleys. Below: The Carlsbad Caverns in New Mexico contain vast underground chambers adorned with gleaming stalactites and stalagmites. The caves, among the largest in the world, are the principal feature of Carlsbad Caverns National Park.

New Mexico Dept. of Development





Washington State Dept. of Commerce

North America. Plate 3. Agriculture is a major economic activity of the north central and northwestern United States. Above: Rolling fields of wheat near Goldendale, in south central Washington, a leading wheat-producing State. Below: The farms of Nebraska are large and productive, raising various grains and other crops as well as livestock.

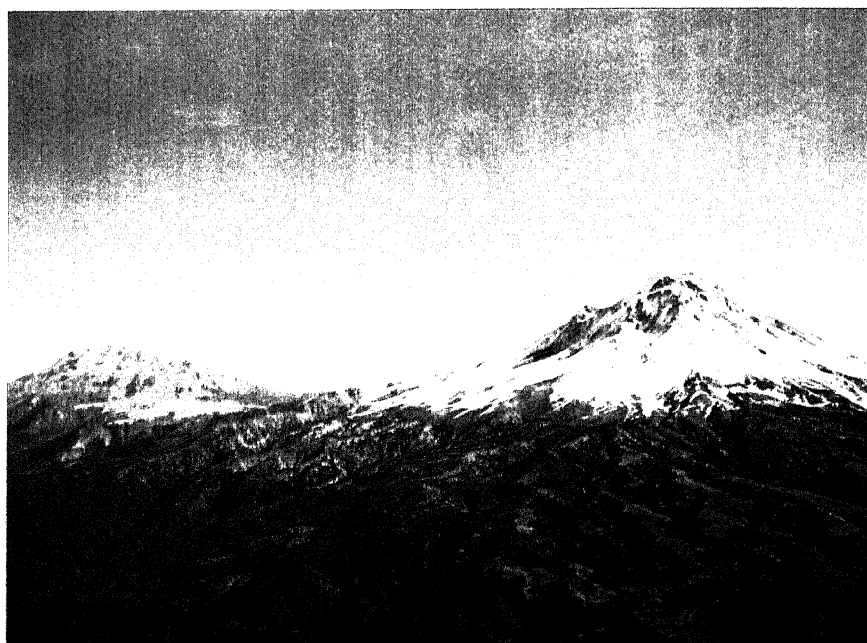


Nebraska Information and Tourism Div.

North America. Plate 4.
 Left: Saint George, one of the small islands of Bermuda, is noted for its white sand beaches, blue waters, and colorful plants and coral rocks.
 Below: A mountainous view of central Mexico. At left is the 17,343-ft. dormant volcano Iztaccihuatl, popularly called the Sleeping Woman; and at right, the 17,887-ft. Popocatepetl, which contains pure sulfur deposits in its largest crater.



Bermuda News Service



Mexican National Tourist Council

cupied by the French and English colonial empires. The French colonies were widely scattered. The principal settlements were grouped in Canada and near the mouth of the Mississippi R., and a line of trading and military posts along the Ohio and Mississippi rivers connected the two regions. The English colonial holdings consisted of twelve colonies extending along the Atlantic seaboard. A thirteenth, Georgia, was chartered in 1733.

War and Revolution. As a consequence of efforts to expand westward beyond the Alleghenies, the English eventually came into conflict with the French in the Ohio valley. In 1689 the two powers began a worldwide struggle for military and colonial supremacy. In North America the conflict was fought in four successive phases, namely King William's War, which lasted from 1689 to 1697; Queen Anne's War, from 1702 to 1713; King George's War, from 1744 to 1748; and the French and Indian War (qq.v.), which lasted from 1754 to 1763. Reverses suffered in the last-named war and in its European extension, the Seven Years' War (q.v.), forced the French to capitulate. By the Treaty of Paris of 1763 France was forced to yield to Great Britain all its holdings in Canada and also all of Louisiana east of the Mississippi. France had previously ceded to Spain, its ally, New Orleans and all French territory west of the Mississippi.

The outstanding event of the two decades from 1763 to 1783 on the continent was the economic, political, and military conflict between Great Britain and its thirteen colonies along the Atlantic seaboard south of Canada. For the causes and events of this conflict, which terminated in the establishment of the United States of America, see AMERICAN REVOLUTION; UNITED STATES: *History*. The success of the thirteen colonies in freeing themselves from the oppressive rule of their mother country soon had repercussions among the Spanish colonies in the Americas. Inspired by their victory and also by the outcome of the French Revolution (q.v.), and taking advantage of the involvement of Spain in the Napoleonic Wars (q.v.), in 1810 the Spanish colonies in the Americas began a struggle for independence. Mexico revolted against Spain in that year, but did not actually become free until 1821. Central America, then called the Captaincy General of Guatemala, proclaimed its independence in 1821. (For later history of the Central American nations and of Panama, see the individual articles on each country.) During the 19th and 20th centuries Canada succeeded in obtaining from Great Britain a full degree of self-government.

Territorial Expansion. Two additional outstanding developments marked the history of North America in the 19th century, and they continued in the 20th. One was the unparalleled growth of the U.S. in population and wealth; the nation's resolution of many internal economic and political problems, particularly those of Negro slavery and national unity; and its emergence toward the end of the 19th century as a great world power. Concomitant with these developments was the territorial growth of the nation.

WARFARE WITH INDIANS. American territorial expansion, sometimes called "the winning of the West", was marked by merciless warfare against the Indian tribes that resisted encroachment on their domains. Except in scattered areas, particularly in the southern Appalachians, the Indians living east of the Mississippi R. had been eliminated as an effective force by the final decade of the 18th century. Some of the tribes had withdrawn westward, but the great majority had been decimated or completely destroyed. To a large degree the tragic fate of the aborigines of eastern North America was a result of the involvement of their various tribes and nations in the wars and political rivalries among the colonizing powers, particularly the French and English. Many thousands of Indians, however, perished in futile localized attempts to wrest their ancestral lands from the usurpers. In 1637 the Pequot (q.v.), one of the great tribes of the New England region, were virtually exterminated in the course of such an action (see CONNECTICUT: *History*). Later in the century the Wampanoag sachem Philip (q.v.) organized a confederation of New England tribes for struggle against the English colonists. During the ensuing conflict, King Philip's War, fought in 1675 and 1676, the Indians inflicted numerous severe defeats on their adversaries, but were finally overcome, mainly as the result of treachery within their own ranks, and were nearly exterminated.

Between 1832, when the Sac and Fox chief Black Hawk (q.v.) initiated a war in defense of tribal lands east of the Mississippi R., and 1877, when the Nez Percé (q.v.) tribe of Oregon was vanquished, the Indians of the Great Plains, the Southwest, and the Rocky Mts. contested almost every major American move westward. Much of this armed opposition to the authority of the U.S. originated among the Sioux (q.v.), one of the chief peoples of western North America. Sioux resistance reached a memorable climax at the Battle of the Little Bighorn, fought in Montana on June 25, 1876. In this battle a large force of Indian braves under the command of the

NORTH AMERICA

Sioux chiefs Crazy Horse, Sitting Bull (qq.v.), and Gall (1840?–94) annihilated a United States Army detachment numbering 265 men; see *LITTLE BIGHORN, BATTLE OF THE*.

Meanwhile, the U.S. government had, by treaty arrangements, land purchases, and the establishment of reservations (see *INDIAN RESERVATIONS*), obtained the cooperation of some tribes and reduced the hostility of others. In 1849 after the creation of the Bureau of Indian Affairs (see *INDIAN AFFAIRS, BUREAU OF*), an agency of the Federal Department of the Interior, the lot of the Indians in the U.S. slowly and very gradually improved. Both in the U.S. and Canada, however, the overwhelming majority of Indians continue to live on reservations. In many of these areas, which represent a poorly integrated fusion of the red man's civilization with that of the white man, the economic plight of the Indians is serious.

In addition to acquisitions of contiguous territory in the 19th and 20th centuries, the U.S. obtained other regions in North America. These regions were Alaska, discovered in 1741 by the Danish navigator Vitus Bering (q.v.) while in the service of Russia, and sold by Russia to the U.S. in 1867 for \$7,200,000; Puerto Rico, ceded by Spain in 1898 after the Spanish-American War (q.v.); the Panama Canal Zone, acquired in 1903; and the Virgin Islands of the United States (qq.v.), purchased from Denmark in 1917 for \$25,000,000.

Hemispheric Developments. A second important development in the history of the continent in the 19th and especially in the 20th centuries was the participation of the North American nations in the movement manifest throughout the Western Hemisphere for economic cooperation, for the attainment of peace and mutual understanding, and for solidarity against potential aggressors. In this movement the U.S. played a leading part. The principal display of hemispheric solidarity in the 19th century was the proclamation in 1823 by U.S. President James Monroe (q.v.) of the Monroe Doctrine (q.v.), which stated the intention of the U.S. not to permit European control of territory in the Americas beyond that existing at the time. The only serious intracontinental conflict was the so-called Mexican War (q.v.) of 1846–48 between the U.S. and Mexico. During the 20th century a tendency toward mutual friendship has been apparent among the nations of the Western Hemisphere; see *INTER-AMERICAN CONFERENCES*. A notable expression of the desire for peace and understanding among the nations of North and South America was the establishment

in 1910 of the Pan American Union (q.v.). In World War I almost all the nations of the Western Hemisphere either declared war upon or broke diplomatic relations with the Central Powers (q.v.). In World War II most of these nations acted similarly toward the Axis Powers (q.v.).

The most important demonstration of hemispheric solidarity in recent years was the Inter-American Defense Conference of 1947, which promulgated the Inter-American Treaty of Reciprocal Assistance, also known as the Rio Treaty (q.v.). The treaty was signed in September, 1947, by the U.S., Mexico, and seventeen Central and South American nations, and provides for amicable settlement of disagreements between nations of the Western Hemisphere, as well as for joint defense against aggression on the region extending from the Bering Sea to the South Pole.

In 1948 the Organization of American States (q.v.), known as O.A.S., was formed to implement the Rio Treaty and to form a collective-security system.

Hemispheric cooperation was furthered by the Alliance for Progress (q.v.), which was announced in 1961. The alliance, which was accepted by the U.S. and nineteen other American nations at Punta del Este, Uruguay, consists of a ten-year development plan to raise the economic and social level of the area and to strengthen its democratic institutions.

The existence after 1959 of a Communist regime in Cuba tended to mar the solidarity of hemispheric activities. In 1962 at Punta del Este, the O.A.S. voted to exclude Cuba "from participation in the Inter-American system" because of that nation's alignment with the countries of the Communist bloc. Subsequently the U.S., announcing that it had discovered Soviet missile bases in Cuba, blockaded the island and demanded the removal of the bases. The Soviet Union complied and removed the weapons by the end of the year.

Particularly friendly and cooperative since the War of 1812 (q.v.) have been the relations between the U.S. and Canada. No military installations aimed at defense against each other have existed since that time on the entire border between the two nations. The U.S. and Canada collaborated closely in the fight against the Axis Powers during World War II. In the postwar period, usually referred to as the era of the cold war (q.v.), the Canadian and American governments initiated plans for joint defense against possible aggression from the Soviet Union across the arctic regions.

NORTHAMPTON, city in Massachusetts, and county seat of Hampshire Co., on the Connecticut R., 16 miles N. of Springfield. The city is a manufacturing and educational center. The chief industries produce brushes, crates and packages, optical goods, and cutlery. Printing and publishing industries are also part of the business life of the city. Northampton is the site of Smith College (q.v.), the Northampton School for Girls, and the Clarke School for the Deaf. Northampton was the birthplace or the residence of many noted Americans, including Jonathan Edwards, leading clergyman and theologian; Timothy Dwight, a grandson of Jonathan Edwards and a prominent educator; and Calvin Coolidge (qq.v.), President of the United States. Northampton was first settled in 1654 and was incorporated as a city in 1883. Pop. (1960) 30,058; (1970) 29,664.

NORTHAMPTON, Great Britain, county borough and administrative center of Northamptonshire, England, on the Nene R., about 60 miles N.W. of London. The town is a center for the manufacture of boots, shoes, and leather goods. Other industries include metalworking and the manufacture of automobile bodies, elevators, machinery, and pharmaceutical products. Founded by the Anglo-Saxons, Northampton was occupied by Danes at the end of the 9th century. In 1460 King Henry VI (q.v.), King of England, was defeated by the Yorkists at Northampton. Pop. (1971) 126,608.

NORTHAMPTONSHIRE, Great Britain, county of south-central England. An agricultural and livestock-raising region, Northamptonshire also has iron-ore mines and is a center of boot and shoe manufacturing. The county borough of Northampton (q.v.) is the administrative center. Part of the Anglo-Saxon kingdom of Mercia, Northamptonshire was probably made a county during Danish rule. Area, 914 sq.mi. Pop. (1971) 467,843.

NORTH ARLINGTON, borough of New Jersey, in Bergen Co., on the Passaic R., about 6 miles W. of West New York. The city manufactures paints, metal products, cement blocks, toys, and rubber, Bakelite, and celluloid products. Pop. (1960) 17,477; (1970) 18,096.

NORTH ATLANTIC TREATY ORGANIZATION, commonly called NATO, international agency created in 1949 to implement the North Atlantic Treaty that was signed on April 4 of that year by the governments of Belgium, Canada, Denmark, France, Great Britain, Iceland, Italy, Luxembourg, the Netherlands, Norway, Portugal, and the United States. Greece and Turkey were admitted to the organization effective

February, 1952, and the Federal Republic of Germany (West Germany) in May, 1955.

The North Atlantic Treaty. The treaty was designed to promote "stability and well-being in the North Atlantic area", and was signed in Washington, D.C., by representatives of the twelve nations originally involved. The treaty was designed to counteract possible Soviet expansion into Western Europe, following the establishment of Communist regimes in Eastern European countries after World War II, and declared that "an armed attack against one . . . shall be considered an attack against them all".

The treaty contains a preamble and fourteen articles, with the following provisions: article 1 pledges the parties to seek peaceful settlement of all disputes arising between themselves and other powers; article 2 pledges the parties to promote political and economic cooperation among themselves; article 3 calls for "continuous and effective self-help and mutual aid" to develop "individual and collective capacity to resist armed attack"; article 4 provides for mutual consultation whenever "the territorial integrity, political independence, or security of any of the parties is threatened"; article 5 pledges the use of armed force in "collective self-defense"; article 6 defines the area covered in the agreement, excluding Asian and central or southern African colonies of the signatories; article 7 affirms that the obligations of the signatories under the Charter of the United Nations shall take precedence over their obligations under the treaty; article 8 provides against conflict between the treaty and past or future international obligations assumed by the signatories; article 9 calls for the establishment of a consultative council between the parties, one of the provisions of which was the immediate establishment of a defense committee; article 10 covers the admission of new powers to participation in the treaty by unanimous agreement; article 11 outlines the ratification procedure for the treaty; article 12 outlines the procedure for possible future amendments of the treaty; article 13 defines the procedure for withdrawal from the treaty after the passage of twenty years; and article 14 provides for placing the signed treaty in the U.S. government archives.

Structure. The principal body of NATO is the North Atlantic Council, with headquarters in Brussels, Belgium, and consisting of the representatives of all the governments acceding to the treaty. The council is composed of the cabinet officers responsible for conducting the foreign affairs of their nations, with or without the cabinet officers responsible for national

NORTH ATLANTIC TREATY ORGANIZATION

defense. In February, 1952, it was determined that the council may consist of other cabinet officers, or heads of state of the signatory powers. Continuous functioning of the council was ensured by a permanent representative of each government, and responsibility for the organization of the council's activities and the direction of its secretariat was vested in a secretary-general.

The council is assisted in its functions by committees, some of which are temporary. The military committee, which is composed of the chiefs of staff of the signatory powers (except France), assists the council in matters of military nature. It meets two or three times a year, but a subcommittee made up of lower-level military representatives remains in permanent session. Military leadership of NATO in Europe, authorized by a council decision in December, 1950, is exercised by Supreme Headquarters Allied Powers in Europe (SHAPE), which is responsible for maintaining the troop levels and equipment for the defense of Europe and the Mediterranean area. The head of SHAPE, which is located in Casteau, Belgium, is the Supreme Allied Commander Europe (SACEUR). The first SACEUR was General of the Army Dwight David Eisenhower (q.v.). Military maneuvers are conducted by SHAPE annually, and NATO maintains a defense college in Rome, Italy. The defense of the northern Atlantic area is under the command of the Supreme Allied Commander Atlantic (SACLANT), whose headquarters are at Norfolk, Va.

Development. West German participation in NATO was a major objective of the council almost from the inception of the organization. It presented grave difficulties, largely because of French fears of a resurgent Germany. In February, 1952, the council approved a formula by which a Western European army would form part of the North Atlantic defense system, and this became the basis of the European Defense Community Treaty. This treaty was signed by Belgium, France, West Germany, Italy, Luxembourg, and the Netherlands in May, 1952; it included provisions for a 43-division army under the command of SHAPE. The French National Assembly, however, rejected the treaty in 1954, and inasmuch as ratification by the parliaments of the signatories was a prerequisite, a new formula for bringing West Germany into NATO was devised, and in May, 1955, West Germany was granted membership in NATO and the Brussels Treaty Organization. The latter, to which Italy also was admitted, was renamed the Western European Union (q.v.). The formula

adopted in 1955 stipulated that West German forces be under the ultimate command of NATO.

In 1955 the Warsaw Treaty Organization (q.v.), a defense grouping of the Soviet Union and six Eastern European nations, was formed.

Problems began to develop within NATO during the early 1960's as the military threat from Communist countries lessened. France wanted to pursue a more independent role in European affairs, and the U.S., Canada, and Great Britain were affected by high foreign-exchange costs of maintaining large troop deployments in West Germany. Also, Portugal intensified its military efforts in order to contain uprisings in its African territories, and was dissatisfied at the lack of allied support. France withdrew from the military committee in 1966, stopped military participation in NATO, and requested removal of U.S. and Canadian air and logistical bases from France, but did not abrogate the treaty. The North Atlantic Council, NATO's political headquarters, and SHAPE were moved from Paris to Belgium, and the bases were evacuated in 1967.

The Middle East crisis of 1967 (*see* MIDDLE EAST: *History*), after which Soviet influence in the Mediterranean increased, was followed by the Soviet-led invasion of Czechoslovakia (q.v.) in 1968, which resulted in the stationing of more Soviet divisions west of the Oder R. than ever before. Canada and the U.S., however, continued to withdraw troops, following agreement that they would be available to NATO in case of emergency. British forces being withdrawn from east of Suez were put under NATO control, and military reductions by other allies were halted; several other member countries augmented their armed forces. France remained formally disengaged, but continued to maintain an informal liaison with NATO.

At the end of the 1960's, as the explicit military threat to the Western European countries appeared to decline, NATO began to place increased emphasis upon political, economic, and scientific cooperation among its members.

The NATO alliance came under great strain in the early 1970's. The allies were deeply divided over the 1973 Arab-Israeli war, with only the U.S. coming to the aid of Israel; Greece and Turkey ventured close to war over events on Cyprus (q.v.) in 1974; and the rise of Communist power in Portugal, beginning in 1974, made that country's role in NATO problematical. Negotiations for a mutual and balanced reduction of NATO and Warsaw Treaty Organization forces



The nations that are members of NATO meet regularly during the year to discuss "stability and well-being in the North Atlantic area" UP:1

in Europe began in 1973, but were soon stalled in disagreement.

NORTH BERGEN, township of New Jersey, in Hudson Co., between the Hackensack and Hudson rivers, N. of Jersey City and opposite Manhattan Island. Manufactured products are electric and industrial equipment, apparel, textiles and yarn, building materials, lamps, essential oils, petroleum and metal products, pens and pencils, toys, food products, plastic and cork products, paper products, and jewelry. An annual German folk festival is held in North Bergen. The township was formed in 1861. Pop. (1960) 42,387; (1970) 47,751.

NORTHBROOK, village of Illinois, in Cook Co., about 21 miles N.W. of central Chicago. The village has varied manufacturing. Pop. (1960) 11,635; (1970) 27,297.

NORTH CAPE, promontory in Europe, in N Norway, at latitude 71°11' N., often referred to as the most northerly important point of the continent, although it is not on the continent but on the island of Magerö. The northernmost point of the continent itself is Cape Nordkyn, 6 mi. to the S. of North Cape.

NORTH CAROLINA, one of the South Atlantic States of the United States, bounded on the N. by Virginia, on the E. and SE by the Atlantic Ocean, on the S. by South Carolina and Georgia, and on the W. and N.W. by Tennessee. North Carolina measures about 503 mi. from E. to W and about 188 mi. from N. to S.

THE LAND

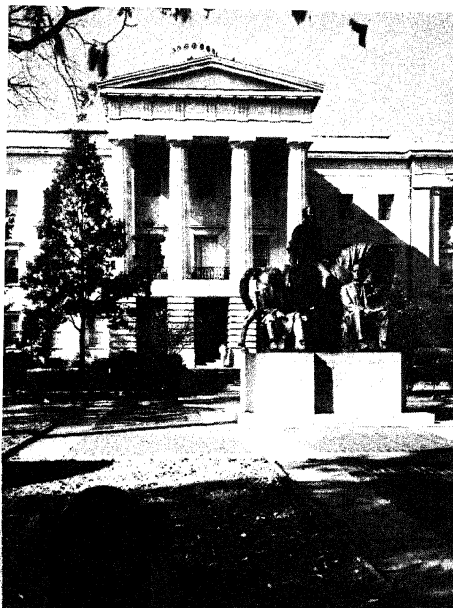
North Carolina has three main physiographic provinces: the Coastal Plain, which comprises the E. half of the State; the Piedmont Plateau, which occupies the center of the State; and the Appalachian Mt. region in the W. portion.

The Coastal Plain, level and sandy, stretches inland for an average distance of 150 mi., is nowhere more than 500 ft. above sea level, and covers an area of about 26,000 sq.mi. It is bordered by swamps, inlets, estuaries, and a chain of long, narrow barrier reefs that extend for about 325 mi. along the coast from the N. border of the State to Cape Fear. The barrier reefs enclose Albemarle and Pamlico sounds, and form the inner boundary of Raleigh and Onslow bays. Although the general coastline of the State is only 301 mi., the overall length measured around tidal bays, inlets, and estuaries is 3074 mi.

The Piedmont Plateau region is separated from the Coastal Plain by the fall line, which marks a sharp increase of 200 ft. in elevation. The plateau covers an area of about 20,000 sq.mi. and rises to the W. at a rate of 3 to 4 ft. per mile until it joins the mountain region, about 1200 ft. above the level of the plateau.

The portion of the Appalachian system that crosses North Carolina covers an area of about 6000 sq.mi. and consists of the Blue Ridge Es-

Area (28th in rank)	52,586 sq. mi.
Land	48,798 sq. mi.
Inland water	3788 sq. mi.
Population	(1970, 12th in rank) 5,082,059
	(1960, 12th in rank) 4,556,155
	(1950) 4,061,929
Altitude	see level to 6084 ft.
Capital	Raleigh (1970) 121,577
Largest city	Charlotte (1970) 241,178
Entered Union (12th of original 13)	Nov. 21, 1789
Nickname	The Tar Heel State
Motto	Esse Quam Videri (To Be Rather Than to Seem)
Song	"The Old North State"
Tree	pine
Flower	dogwood
Bird	cardinal



The historic State capitol Raleigh, N.C.
State of North Carolina

carpment and the Great Smoky Mts. Some forty-three peaks in the Great Smoky Mts. reach elevations exceeding 6000 ft., and four peaks in the Blue Ridge Escarpment exceed 5000 ft. The highest point in the State, and the highest point E. of the Mississippi R., is Mt. Mitchell (6684 ft.), in Yancey County. The lowest point in the State is at sea level along the coast. The average elevation of North Carolina is 700 ft.

Rivers and Lakes. The Blue Ridge Escarpment forms the watershed for the Atlantic slope. West of the ridge, North Carolina is drained by rivers and streams that flow into the Mississippi basin. The principal rivers E. of the Blue Ridge flow in a generally southeasterly direction; they include the Roanoke, Tar, and Neuse rivers, which flow into Albemarle and Pamlico sounds through deep and wide estuaries; the Cape Fear R., which flows into the Atlantic at Cape Fear; the Catawba R., which flows into South Carolina; and the Yadkin R., which joins the Uwharrie R. to form the Pee Dee R. in S. North Carolina. The natural lakes of North Carolina are small. Among artificial lakes are Fontana Lake on the Little Tennessee R., Apalachia Reservoir and Hiwassee and Chatuge lakes on the Hiwassee R., and High Rock Lake on the Yadkin R.

Climate. The wide range of elevations and distance from the ocean provide North Carolina with the most varied climate of any eastern State. In all seasons of the year, the average tem-

perature varies more than 20° F. from the coast to the mountains. Winters are normally cool, with occasional cold spells, and summers are hot. The highest temperature recorded in the State was 109° F. (at Weldon); the lowest, -23° F. (at Mt. Mitchell). Summer rainfall is the greatest and the most variable, occurring in showers or thunderstorms. Average winter snowfall ranges from 1 in. on the Outer Banks to 8 in. in the mountains, although some of the upper slopes receive nearly 50 in. The average annual number of days with measurable precipitation is 110 at Charlotte, 115 at Raleigh and Winston-Salem, and 116 at Wilmington. Hail and strong winds sometimes accompany summer thunderstorms, and tropical hurricanes influence the weather about twice a year.

Climate	Charlotte	Raleigh	Wilmington
Normal temperatures (in ° F.)			
January maximum	52.1	51.1	56.6
January minimum	32.1	30.0	36.2
July maximum	88.3	87.7	88.8
July minimum	68.7	67.2	72.0
Annual	60.5	59.1	63.7
Normal precipitation (in inches)			
Wettest month	4.57	5.08	8.34
Driest month	2.09	2.81	3.01
Annual	42.72	42.54	53.59
Latest frost	March 21	March 24	March 8
Earliest frost	Nov. 15	Nov. 16	Nov. 24
Mean number of days between latest and earliest frost	239	237	262

Plants and Animals. About 3000 kinds of plants, shrubs, and trees are found in North Carolina. Of about 200 kinds of trees, the various species of southern pine are the most common. Other important species include oaks, hickories, gums, cypresses, yellow poplar, white pine, white mulberry, tulip, and catalpa. Some 150 species of shrubs include the native azalea, sumac, holly, and yaupon. About 200 native grasses are found in the State. Mosses, ferns, vines, and wild flowers grow in profusion.

Many species of animals are found in North Carolina, including the black bear, white-tailed deer, wildcat, raccoon, gray and red foxes, river otter, striped skunk, long-tailed weasel, eastern mole, opossum, eastern cottontail rabbit, the introduced wild boar, and gray and fox squirrels. Freshwater and saltwater fish are abundant. The most common freshwater varieties are catfish, carp, shad, bream, trout, bass, perch, and crappie. Among the saltwater fish are mullet, red snapper, flounder, mackerel, herring, butterfish, perch, sea bass, croaker, pompano, menhaden, bonito, sturgeon, and bluefish. The species of shellfish most commonly found are oyster, clam, crab, shrimp, and scallop. About forty species of snakes are found, including such poisonous va-

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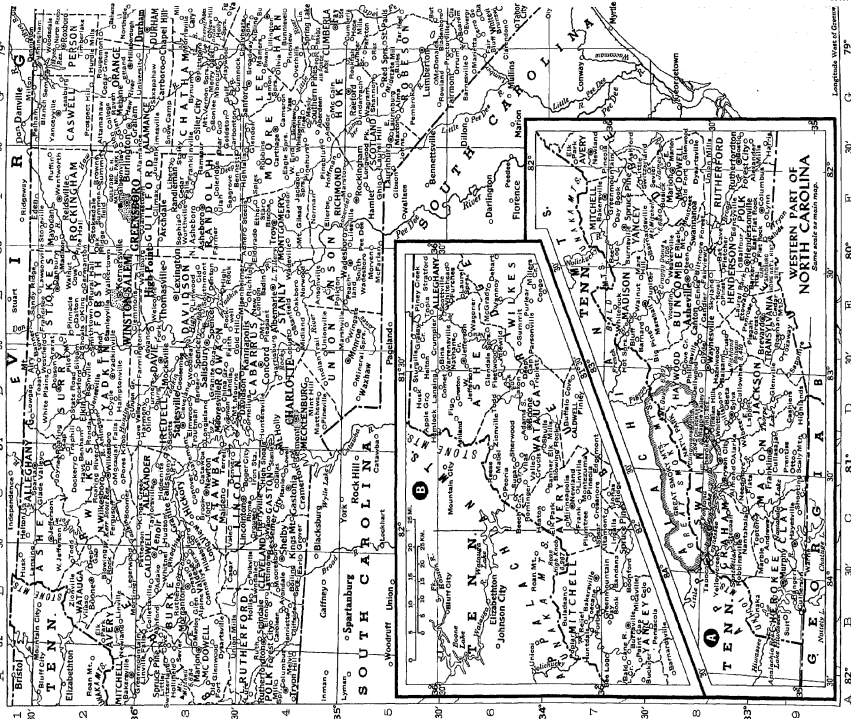
Cities and Towns

Abbotsburg	H 5	China Grove	D 3	Gibsonville	F 2	Longwood Park	F 5
Aberdeen	G 4	Chocowinity	L 4	Glen Alpine	B 3	Louisburg	J 2
Ahoskie	L 2	Claremont	C 3	Glen Raven	G 2	Lowell	C 4
Alamance	F 2	Clarkton	J 6	Goldston	K 4	Lowgap	D 1
Alexander	D 6	Clayton	J 3	Graham	G 2	Lowland	N 4
Albemarle	E 4	Clemmons	E 2	Granite Falls	C 3	Lucama	J 3
Alliance	M 4	Cleveland	D 3	Granite Quarry	D 3	Lumberton	G 5
Altamahaw	G 2	Cliffside	B 4	Grantsboro	M 4	Lynn	F 9
Andrews	C 9	Climax	F 3	Greenmountain	B 7	Macdonald	K 3
Angier	H 4	Clinton	J 5	Greensboro	F 2	Madden	E 2
Ansonville	E 4	Cloyd	E 8	Greenville	L 3	Magnolia	K 5
Apex	H 3	Coit	H 4	Grifton	L 4	Maiden	C 3
Archdale	F 3	Colinbrook	N 2	Grover	C 4	Mamers	G 4
Arlington	D 2	Coleridge	F 3	Halifax	K 2	Marble	C 9
Ashboro	F 3	Columbia	N 3	Hamilton	L 3	Marion	A 3
Ashville	E 8	Columbus	F 9	Hamil	F 5	Marshall	E 8
Atlantic	N 5	Concord	D 4	Harkers Island	M 5	Marshallberg	N 5
Aulander	L 2	Connellys Springs	B 3	Harrisburg	D 4	Mars Hill	E 7
Aurora	M 4	Conover	C 3	Hatteras	O 4	Marshville	E 4
Avondale	B 4	Conway	L 2	Havelock	L 5	Matthews	D 4
Ayden	L 4	Coolsmee	D 3	Haw River	G 2	Maury	K 4
Badin	E 4	Cornelius	D 4	Hayesville	C 9	Maxton	G 5
Bailey	J 3	Cove City	L 4	Hays	C 2	Mayodan	F 2
Bakersville	B 7	Cramerton	C 4	Haywood	G 3	Maysville	L 5
Balfour	F 8	Credmoor	H 2	Hazelwood	D 8	McCain	G 4
Banner Elk	C 7	Creswell	N 3	Henderson	J 2	Mebane	G 2
Bannertown	D 1	Crossnore	C 7	Hendersonville	F 8	Middlesex	M 5
Barker Heights	E 9	Crouse	C 4	Henrietta	B 4	Midland	E 4
Bat Cave	F 8	Cruso	E 8	Hertford	N 2	Midstate Mill	G 5
Battleboro	K 2	Cumberland	H 5	Hickory	C 3	Midway Park	K 5
Bayboro	M 4	Dallas	C 4	Hiddenite	C 3	Mint Hill	D 4
Bear Creek	C 3	Danbury	E 2	Highlands	D 9	Misenheimer	E 4
Beaufort	M 5	Davidson	D 4	High Point	E 3	Mocksville	D 3
Beech Creek	C 6	Davis	M 5	Hillsboro	B 3	Moncure	G 3
Belhaven	M 3	Delco	J 6	Hillsborough	G 2	Monroe	E 5
Belmont	D 4	Denton	E 3	Hobgood	L 2	Mooresville	D 3
Benson	J 4	Dobson	D 2	Hobucken	N 4	Mooresville	D 3
Bessemer City	C 4	Dover	L 4	Hoffman	F 4	Mooresville	D 3
Beta	D 8	Drexel	B 3	Hollister	K 2	Morganton	B 3
Bethel	L 3	Dunn	H 4	Holly Springs	H 3	Morven	E 5
Beutelsville	K 5	Durham	H 2	Hookerton	K 4	Mount Airy	D 1
Blittmore Forest	F 8	Dysartsville	G 8	Hope Mills	H 5	Mount Gilead	F 4
Biscoe	F 4	Eagle Springs	F 4	Hot Springs	E 7	Mount Holly	D 4
Black Creek	K 3	East Bend	D 2	Hubert	L 5	Mount Mourne	D 3
Black Mountain	F 8	East Flat Rock	F 9	Hudson	C 3	Mount Olive	K 4
Bladenboro	H 5	East Laurinburg	G 5	Huntersville	D 4	Mount Pleasant	E 4
Blowing Rock	C 7	East Marion	B 3	Icard	C 3	Murfreesboro	M 2
Boger City	C 4	East Spencer	E 3	Jackson	L 2	Murphy	C 9
Bogue	M 5	Eden	F 1	Jacksonville	K 5	Nags Head	O 3
Boling Springs	F 2	Edenton	M 2	James City	M 4	Nashville	K 3
Bolton	B 4	Elford	G 2	Jamestown	F 3	Neuse	H 3
Boone	D 6	Elizabeth City	N 2	Jamestown	F 3	New Bern	L 4
Boonville	D 2	Elizabethtown	H 5	Jefferson	M 3	Newland	C 7
Brevard	E 9	Elkin	D 2	Jonesville	E 6	Newport	M 5
Bridgeton	M 4	Elk Park	C 7	Kannapolis	D 4	Newton	C 3
Broadway	G 4	Ellerbe	F 4	Kenansville	K 5	Newton Grove	J 4
Brookford	C 3	Elm City	K 3	Kenilworth	J 3	Norlina	J 2
Browns Summit	F 2	Elon College	G 2	Kernersville	E 2	North Asheboro	F 3
Bryson City	D 8	Enfield	K 2	Kill Devil Hills	O 3	North Harlowe	M 5
Bules Creek	H 4	Engelhard	O 3	King	E 2	North Roxboro	G 2
Bullock	H 2	Enka	E 8	Kings Mountain	C 4	North Wilkesboro	C 2
Burgaw	J 5	Erwin	H 4	Kinston	K 4	Norwood	E 4
Burlington	F 2	Etowah	E 8	Kittrell	H 2	Oakboro	E 4
Burnsville	B 7	Fair Bluff	H 6	Kitty Hawk	O 2	Oak City	L 3
Butner	H 2	Fairfield	N 3	Knightdale	J 3	Oak Ridge	F 2
Buxton	G 3	Fairmont	G 6	Knotts Island	O 2	Ocracoke	A 4
Bynum	P 4	Fairview	E 8	Kure Beach	K 7	Old Fort	C 3
Calyoso	J 4	Faison	J 4	La Grange	K 4	Olen	M 4
Camden	N 2	Faith	E 3	Lake Lure	A 9	Oteen	E 8
Candler	E 8	Farmville	K 3	Lake Toxaway	G 4	Oxford	H 2
Candor	F 4	Fayetteville	H 4	Lakeview	E 6	Parkton	H 5
Canton	E 8	Flat Rock	F 9	Lake Waccamaw	J 6	Peachland	E 5
Caroleen	B 4	Fletcher	E 8	Landis	D 3	Pembroke	G 5
Carolina Beach	K 6	Forest City	B 4	Laurel Hill	F 5	Penrose	E 8
Carrboro	G 3	Fountain	H 4	Laurel Park	E 8	Phillipsville	D 8
Carthage	F 4	Four Oaks	H 4	Laurinburg	F 5	Pilot Mountain	F 4
Cary	H 3	Franklin	C 9	Lawndale	B 4	Pinebluff	D 2
Castle Hayne	K 6	Franklinton	J 2	Leland	J 6	Pine Hall	F 2
Catawba	C 3	Franklinville	F 3	Lenoir	C 3	Pinehurst	F 4
Catharine Lake	K 5	Freeland	J 6	Lexington	E 3	Pine Level	J 4
Cedar Falls	F 3	Fremont	J 3	Liberty	F 3	Pineola	C 7
Chadbourne	H 6	Fuquay-Varina	H 3	Ulesville	F 5	Pinetops	K 3
Chapel Hill	H 3	Garland	H 3	Ullinburg	H 4	Pineville	D 4
Charlotte	D 4	Garner	H 3	Lincolnton	C 4	Piney Creek	E 5
Cherokee	D 8	Gaston	K 1	Littleton	K 2	Pink Hill	K 4
Cherryville	C 4	Gastonia	C 4	Long Beach	J 7	Pinnacle	E 2
		Gatesville	M 2	Long View	C 3		
		Gibson	F 5	Longwood	J 6		

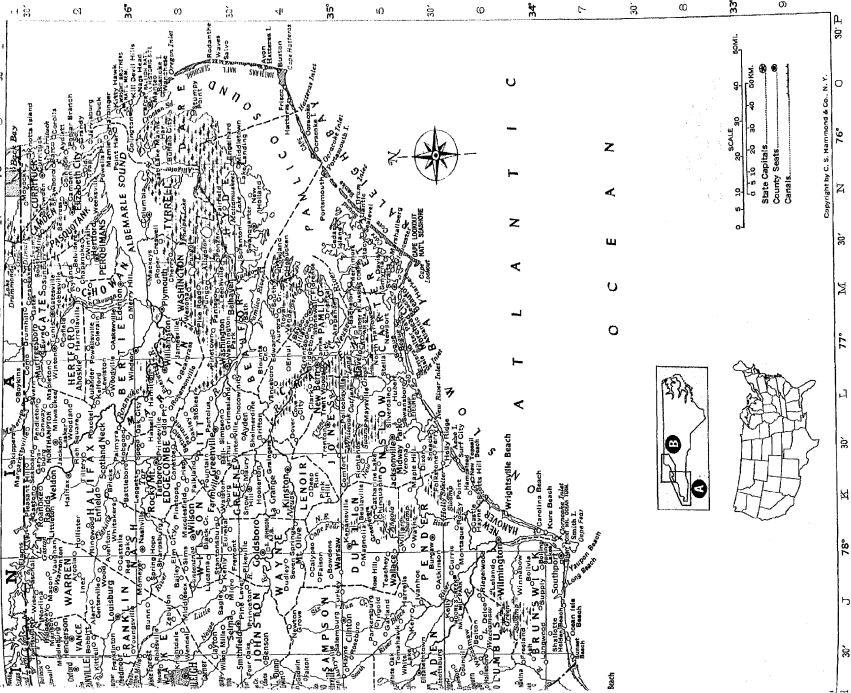
○ County seat.

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Plymouth	◊ M 3	Spencer	D 3	Wise	J 2	Hatteras (isl.)	P 4
Polkton	E 4	Spindale	B 4	Woodfin	E 8	Haw (river)	F 2
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Sophia	F 3	Windsor	◊ L 2			Wright Brothers Nat'l	
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South Mills	N 2	Wingate	E 5			Yadkin (river)	E 3
Southmont	E 3	Winston-Salem	◊ E 2				

Physical Features

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Alligator (lake)	N 3
Alligator (river)	N 3
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Appalachian (mts.)	E 7
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B. Everett Jordan (lake)	H 3
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Cape Hatteras Nat'l	
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Carl Sandburg Home	
Nat'l Hist. Site	E 9
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Catfish (lake)	L 5
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Corps Air Sta.	M 5
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Clingmans Dome (mt.)	D 8
Contentnea (creek)	J 3
Core (banks)	N 5
Core (sound)	N 5
Corncake (inlet)	K 7
Craggy Dome (mt.)	E 8
Croatan (sound)	O 3
Currituck (sound)	O 2
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Deep (river)	F 3
Drum (inlet)	N 5
Fear (cape)	K 7
Fishing (creek)	K 2
Fontana (lake)	C 8
Fort Bragg	H 4
Fort Raleigh Nat'l Hist.	
Site	O 3
French Broad (river)	E 7
Gaston (lake)	K 1
Great (lake)	L 5
Great Dismal (swamp)	N 1
Great Smoky (mts.)	C 8
Great Smoky Mts. Nat'l	
Park	C 8
Green (swamp)	J 6
Guilford Courthouse	N 2
Nat'l Mil. Park	F 2
Guyot (mt.)	D 6

rieties as the coral snake, three species of rattlesnakes, the copperhead, and the cottonmouth. Other reptiles include the alligator.

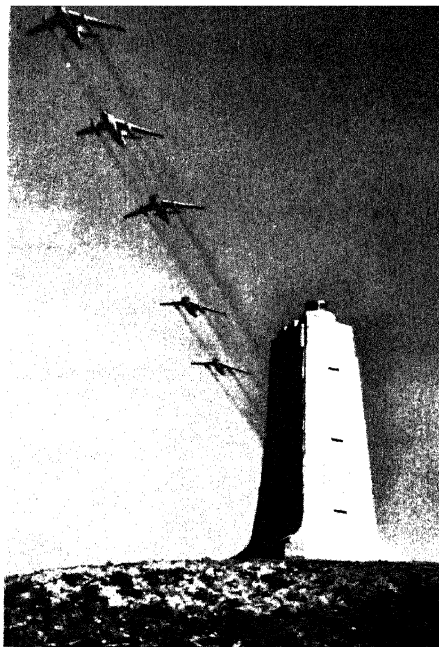
Parks, Forests, and Other Places of Interest.

Great Smoky Mountains National Park (q.v.), in w. North Carolina (partly in Tennessee), contains the highest range in the U.S. e. of the Black Hills and one of the oldest uplands on earth. Historic memorials in the State include Fort Raleigh National Historic Site, on Roanoke Island, site of the "Lost Colony" started by the English explorer Sir Walter Raleigh (q.v.) and birthplace of Virginia Dare (q.v.), the first child born of English parents in America; Guilford Courthouse National Military Park, near Greensboro, site of a pivotal battle in the American Revolution (see GUILFORD COURTHOUSE); and Moores Creek National Military Park (q.v.), scene of a battle (1776) between North Carolina Patriots and Loyalists that advanced the Revolutionary cause in the South. The Wright Brothers National Memorial, at Kill Devil Hill, is the site of the first sustained flight of a heavier-than-air craft. North Carolina has three national forests, comprising more than 1,000,000 acres. Croatan National Forest, near Goldsboro, contains the historic town of New Bern, founded in 1710. Nantahala National Forest, near Bryson City, has many lakes and resorts. Pisgah National forest, near Marion, contains Mt. Mitchell, as well as game preserves and scenic roads and trails. Cape Hatteras National Seashore, along the Outer Banks, is the site of the Cape Hatteras Lighthouse overlooking "the graveyard of the Atlantic". The Cape Lookout area was authorized as a national seashore in 1966. Part of the Blue Ridge National Parkway runs through North Carolina.

North Carolina maintains numerous parks, notable among which are Crabtree Creek State Park, near Raleigh; Mt. Mitchell State Park, within Pisgah National Forest; Fort Macon State Park, near Beaufort; Hanging Rock State Park, near Danbury; Morrow Mountain State Park, near Albemarle; Cliffs of Neuse State Park, near Goldsboro; and William B. Umstead State Park, near Raleigh.

Other points of interest in North Carolina include the birthplace of President Andrew Johnson (q.v.), in Raleigh; the Thomas Wolfe Memorial, in Asheville, home of the novelist; and Orton Plantation, near Wilmington, with a mansion dating from 1734.

Sports. North Carolina has a wide variety of sport fish. Among the freshwater species are black bass, bluegill, white and yellow perch, crappie, landlocked striped bass, and three vari-



Monument to Wilbur and Orville Wright, the aeronautical pioneers, near Kill Devil Hills, N.C.

State of North Carolina

eties of trout. Among game fish off the coast are white marlin, tuna, bonito, amberjack, barracuda, wahoo, dolphin, kingfish, black drum, bluefish, striped bass, and tarpon. Mountain climbing is available in the Great Smokies, where the Appalachian Trail runs along the high peaks; elevations of 6150 ft. are found at Mt. Kephart and 6621 ft. at Mt. Guyot.

THE PEOPLE

According to the 1970 decennial census, the population of North Carolina was 5,082,059, an increase of 11.5 percent over the 1960 population. The urban segment comprised 2,285,168 persons, 45.0 percent of the total, compared with 39.5 percent in 1960. The rural segment comprised 2,796,851 persons, 55.0 percent of the total, compared with 60.5 percent in 1960. Ethnically, the 1970 population was distributed as follows: white persons, 3,901,767, non-whites, 1,180,292, including 1,126,478 Negroes, 44,406 Indians, 2104 Japanese, and a few Chinese, Filipinos, and others. The percentage of American-born residents in 1970 was 99.4; of foreign-born, 0.6. The 1970 population density averaged 104.1 per sq.mi., compared with 93.2 in 1960.

The chief cities are Raleigh, the capital and fourth-largest city, an educational, trade, and manufacturing center; and, in order of popula-



Sheep grazing on the rolling hills near Banner Elk, in northwestern North Carolina. Agriculture and livestock make substantial contributions to the State's income.

Clyde H. Smith—Peter Arnold

tion, Charlotte, a retailing and textile-manufacturing center; Greensboro, an educational and textile-manufacturing center; and Winston-Salem, an industrial center and tobacco market.

The one Indian reservation in the State is the Cherokee settlement at Qualla Boundary.

Education. The public-school system of North Carolina was established in 1839. Education is free and compulsory for all children between the ages of seven and sixteen.

ELEMENTARY AND SECONDARY SCHOOLS. In the early 1970's public elementary schools numbered about 1400 and public secondary schools, about 490. Enrollment in 1971 was about 820,000 in elementary and about 356,000 in secondary schools. Teachers in the public-school system numbered about 33,700 in elementary and about 16,300 in secondary schools. In the early 1970's private institutions included about 125 elementary schools with some 16,000 students, and about 50 secondary schools with some 4000 students. Teachers in private schools numbered about 1200.

UNIVERSITIES AND COLLEGES. In 1970 North Carolina had 97 institutions of higher education, 45 of which were private. University and college enrollment was about 169,000. Public institutions include the University of North Carolina

(q.v.), East Carolina University, Gaston College, North Carolina College at Durham, Western Carolina College, and State universities at Elizabeth City, Fayetteville, Pembroke, and Winston-Salem. Private institutions include Duke University (q.v.), Campbell College, Chowan College, Davidson College, Greensboro College, Guilford College, High Point College, Johnson C. Smith College, Meredith College, Methodist College, Pfeiffer College, Queens College, Saint Augustine's College, Shaw University, Wake Forest University, and Wingate College.

LIBRARIES AND MUSEUMS. North Carolina has about 300 libraries, including regional libraries at Bryson City, Elizabeth City, Murphy, New Bern, Plymouth, Roxboro, Washington, and Winton. Notable cultural centers are the Museum of the American Indian and the Alphonso Whaling Museum, both in Boone; the Museum of the Sea, in Buxton, with a collection depicting the history of the United States Coast Guard and United States Life-Saving Service; the Mint Museum of Art, in Charlotte; the Wright Brothers National Museum, at Kill Devil Hills; and the North Carolina State Museum and North Carolina Museum of Art, both in Raleigh.

THE ECONOMY

North Carolina has a diversified economy. Per capita personal income was \$5409 in 1976, compared with \$6441 for the U.S. as a whole. Agricultural workers make up 8.4 percent of the State's wage earners. Nonagricultural workers

are employed, in descending order of numbers, in manufacturing; wholesale and retail trade; government; service industries; construction; transportation and public utilities; and finance, real estate, and insurance. Tourism, valued at about \$1.28 billion annually, centers on recreational and historical sites.

Manufacturing. According to a recent survey of manufactures, production workers in North Carolina total 568,000. Nearly 40 percent of the workers are employed in the manufacture of textiles and textile-mill products; lesser numbers are employed by the apparel, furniture, and electronic equipment industries. There are numerous centers of manufacturing distributed throughout the State; approximately 18 percent of the production workers are employed in the Standard Metropolitan Statistical Area (S.M.S.A.; q.v.) made up of the cities of Winston-Salem, Greensboro, and High Point, and 9 percent in the Charlotte-Gastonia S.M.S.A. Durham, Wilmington, Raleigh, and Hickory are important small manufacturing cities. In the mid-1970's the annual value added by manufacture (see *VALUE*) in the largest industries was about \$3.3 billion for textile products, \$1.81 billion for tobacco products, and \$1.37 billion for chemicals and allied products. The value added by all manufacturing was about \$13.64 billion per year, making North Carolina the tenth-ranking State in the U.S. in manufacturing.

Agriculture. In the mid-1970's North Carolina ranked tenth in the U.S. in value of annual cash receipts from agriculture, with about \$2.82 billion. Of this total, some \$1.75 billion came from crops and \$1.07 billion from livestock. Tobacco, broiler chickens, hogs, and corn are the State's most valuable agricultural products. North Carolina is by far the leading State in tobacco production, and is the fourth ranking State in production of broiler chickens. It leads the U.S. in production of sweet potatoes, and is third in production of peanuts. Soybeans, cotton, and watermelons are also important. About 188,000 people are employed on 122,000 farms in North Carolina; farmland covers 13,300,000 acres, and the average size of a farm is 109 acres.

Fishing. North Carolina is the leading South Atlantic State in commercial fishing; fishermen number about 4550. Its important fish products are menhaden, hard blue crabs, and shrimp. In the mid-1970's a typical annual catch was 207,000,000 lb., valued at \$17,484,000.

Mining. The most important of North Carolina's varied mineral resources are stone, phosphate rock, lithium minerals, and sand and gravel. It is the leading state in production of

feldspar and mica, and ranks fourth in output of phosphate rock. The total value of North Carolina's mineral production in the mid-1970's was about \$3.39 billion annually, giving it a rank of thirty-sixth in the U.S.

Energy. Generating plants in North Carolina, with a capacity of 15,200,000 kw, produced about 62.5 billion kw hours of electrical energy annually in the mid-1970's. About 2 percent of production and 4 percent of capacity are publicly owned. Major sources of power are Hiwassee and Chatuge dams on the Hiwassee R. and Fontana Dam on the Little Tennessee R., all in the Tennessee Valley Authority (q.v.) network; several nuclear reactors; and the 350,000-kw hydroelectric plant at Cowans Ford.

Forestry. The forest land of North Carolina, which consists of hardwoods and softwoods, comprises some 20,193,000 acres, primarily under private ownership. It produces an annual cut of sawtimber of 2.03 billion bd.ft.

Transportation. The first railroad in North Carolina was the Petersburg Railroad, inaugurated in 1833. Today the State is served by several major railroads, with about 4104 mi. of track. Trucking is a major business in North Carolina. The State has approximately 90,800 mi. of rural and municipal roads, and 34,668 mi. of Federally assisted primary and secondary highways, including 839 mi. in the Interstate Highway System. Three international airlines and eight local and interstate airlines serve the State; there are about 65 public and 172 private airports. Wilmington and Morehead City are the major ocean ports. The Atlantic Intracoastal Waterway, which includes the Dismal Swamp Canal, traverses the coastline. The Tar R. flows into a broad estuary known as the Pamlico R., which in turn flows into Pamlico Sound. Other commercially important waterways are the Roanoke, Neuse, and Cape Fear rivers. The waters off Cape Hatteras are treacherous to shipping because of high winds and hidden shoals.

Communications. The first newspaper in North Carolina was the *North Carolina Gazette*, founded in New Bern in 1751. In the mid-1970's there were about 51 daily newspapers and 22 Sunday papers. The Raleigh *News and Observer* and the Charlotte *News and Observer* are among the leading papers. North Carolina has about 323 radio stations and 26 television stations. One of the oldest radio stations is WBT in Charlotte, which began broadcasting in 1922.

GOVERNMENT

North Carolina is governed under the constitution of 1868, as amended. Executive power is vested in a governor, a lieutenant governor, an

NORTH CAROLINA

attorney general, and a secretary of state, all elected for four-year terms, and other officials. Legislative authority is exercised by the Senate with fifty members and the House of Representatives with 120 members, all elected for two-year terms. Judicial authority is vested in a seven-member supreme court, a court of appeals, superior courts, and district courts.

North Carolina is represented in the United States Congress by two Senators and eleven Representatives.

Local Government. North Carolina is divided into 100 counties and into municipalities and townships. The principal officials of the county include the county commissioners, sheriff, clerk of court, tax assessor, and tax collector. North Carolina has two principal types of municipal government, the council-manager and the mayor-council systems.

Voting Qualifications. Suffrage is extended generally to U.S. citizens eighteen years of age who have resided one year in the State and thirty days in the election precinct.

HISTORY

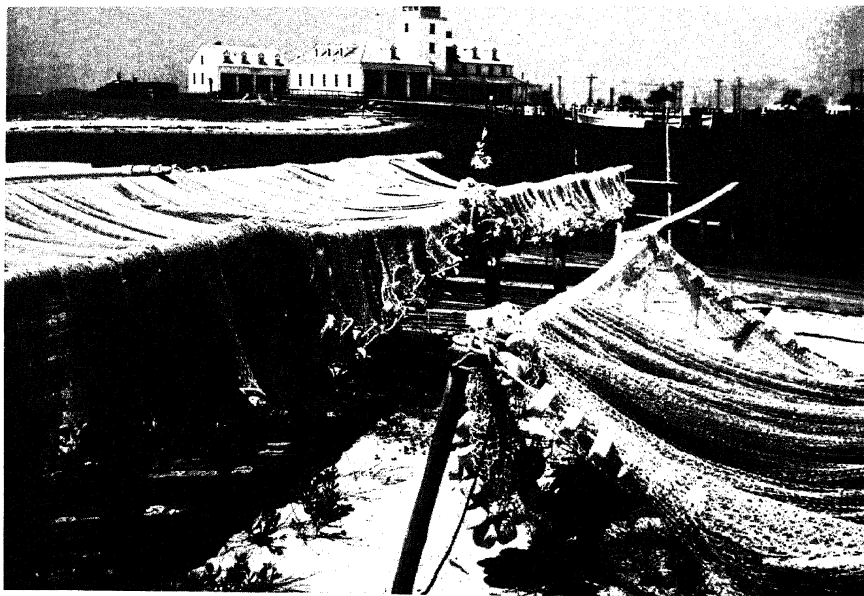
On July 4, 1584, two English explorers, who had been commissioned by Sir Walter Raleigh (q.v.), dropped anchor off the coast of the region comprising present-day North Carolina. Although the region was inhabited by hostile Indians, they reported favorably on it, and as a result a colonizing expedition set out from Plymouth the following year. On Aug. 17, 1585, a colony was established on Roanoke Island (q.v.), but it was abandoned a year later. On July 22, 1587, another group commissioned by Raleigh landed on the island. The colony of 121 men was led by John White (fl. 1585–93), whose granddaughter, Virginia Dare (q.v.), born on Aug. 18, 1587, was the first child of English parents born in America. White went back to England for supplies and returned in 1590 to find that the colony had completely vanished (see CROATAN). In 1629 the land s. of Virginia, which was called Carolina, was granted to Sir Robert Heath by Charles I (q.v.), King of England, but Heath failed to make use of the land, and in 1633 Charles II (q.v.) granted the Carolina territory to eight proprietors. The proprietors divided the grant into North and South Carolina and established a Fundamental Constitution, a system of government drawn up by the English philosopher John Locke (q.v.). The constitution provided for four houses of parliament and three orders of nobility; it was never put fully in operation and was finally abandoned in 1693.

The proprietary period of the colony, which lasted from 1663 to 1729, was turbulent, because

of the independence of the settlers, who occasionally drove out a governor whom they regarded as obnoxious. Indian troubles also beset the colony, but in 1713 the Tuscarora (q.v.), after having massacred many settlers, were defeated and expelled from the Carolinas. The Carolinas did not prove a financial success to most of the proprietors, and in 1728 seven of them sold their grants to the crown. In 1744 the eighth proprietor exchanged his grant for a smaller strip of land in North Carolina. The colonists continued to rebel against the authorities, who were now royal governors, and from 1765 to 1771 the Regulators (q.v.), a group of colonists who refused to pay taxes, were in rebellion against royal authority.

The Years after Independence. The first provincial congress met in 1774 and sent delegates to the first Continental Congress (q.v.). According to tradition, in May, 1775, the so-called Mecklenburg Declaration of Independence of the citizens of Mecklenburg County was enacted, which declared that the royal commissions of the colonies were null and void and advocated the establishment of an independent government. Few historians, however, believe that the Mecklenburg Declaration is authentic. On April 12, 1776, North Carolina became the first colony to instruct its delegates in Congress to vote for independence. The first constitution of the State was adopted on Dec. 18, 1776. North Carolina soldiers took part in many of the important battles of the American Revolution, and in 1776 and 1781 the State was invaded by the British. Delegates were sent to the Constitutional Convention in 1787, but they refused to ratify the instrument in 1788 on the grounds that the central government was too strong. The State did not vote in the first Presidential election. After the adoption of the Bill of Rights, North Carolina ratified the Constitution on Nov. 19, 1789.

The period between the ratification of the Constitution and the Civil War was marked by internal dissension over representation in the State government between the eastern and western counties, and by the emigration of many North Carolina settlers to western territories. In February, 1861, the State opposed secession from the Union; but when President Abraham Lincoln (q.v.) issued a call for troops in order to coerce the seceding States, sentiment in North Carolina changed, and on May 20, 1861, the State passed an ordinance of secession. During the Civil War, North Carolina provided the Confederacy with more than 120,000 troops, lost more soldiers than any other South-



A fishing village of Ocracoke Island on the Outer Banks of North Carolina.
State of North Carolina

ern State, and, during the last year of the war, furnished the Confederate army with food. In 1867, during the period of Reconstruction (q.v.), the civil authority was superseded by the military. The constitution of 1868 established Negro suffrage, and in the same year the Ku Klux Klan (q.v.) began functioning in the State. The Federal government withdrew its military forces from the State in 1868.

The 20th Century. During the first half-century, North Carolina's economy centered on its traditional tobacco and textile industries. World War II produced a shift to more diversified industrial development that accelerated in the postwar years. Today, although the State remains the nation's leading tobacco producer, the industry faces an uncertain future, while imports have inflicted losses on textile mills. Nearly half the population lives and works in urban areas, and demands for expanded public and social services have increased. But strict conservation laws protect the State's unique coastal regions from industrial encroachment.

NORTH CAROLINA, UNIVERSITY OF, State-controlled coeducational institution of higher learning, chartered in 1789, and opened for instruction in Chapel Hill, N.C., in 1795.

Member Institutions. By act of the State general assembly in 1931, the campus at Chapel Hill was merged with the North Carolina College for Women at Greensboro and the North Carolina State College of Agriculture and Engi-

neering at Raleigh to form the University of North Carolina. In 1963 the State general assembly changed the name of the campus at Chapel Hill to the University of North Carolina at Chapel Hill and that at Greensboro to the University of North Carolina at Greensboro. In 1965 the name of the campus at Raleigh was changed to North Carolina State University at Raleigh, and Charlotte College was added as the University of North Carolina at Charlotte. In 1969 Asheville-Biltmore College became the University of North Carolina at Asheville and Wilmington College became the University of North Carolina at Wilmington.

Ten State-supported senior institutions, their names unchanged, were merged with the university in 1971. They were: Appalachian State University, East Carolina University, Elizabeth City State University, Fayetteville State University, North Carolina Agricultural and Technical State University, North Carolina Central University, North Carolina School of the Arts, Pembroke State University, Western Carolina University, and Winston-Salem State University. The merger, which became effective in 1972, resulted in a statewide, multicampus university of sixteen constituent institutions.

Administration. The university's board of trustees was designated the board of governors. Its members are elected by the general assem-

NORTH CASCADES NATIONAL PARK

bly, with authority to choose their own chairman and other officers. Each constituent institution has its own board of trustees of 13 members, 8 of whom are appointed by the board of governors, 4 by the State governor, and 1 of whom, the elected president of the student body, serves *ex officio*. The principal powers of each institutional board are exercised under a delegation from the board of governors. Each institution has its own faculty and student body, and each is headed by a chancellor as its chief administrative officer. The chancellor is responsible to the president as the chief administrative and executive officer of the university. General policy and allocation of function are effected by the board of governors and the president with the assistance of other administrative officers of the university. The general administration office is located in Chapel Hill.

Major Campuses. Of the larger campuses, the University of North Carolina at Greensboro offers, in addition to the bachelor's and master's degrees, a limited number of doctoral programs. Courses are offered in the arts and sciences, business and economics, education, home economics, music, and nursing. In 1973 the library contained 506,200 volumes, enrollment was 7900, and faculty numbered 473.

North Carolina State University at Raleigh, founded as a land-grant college in 1888 (see LAND-GRANT COLLEGES), offers a full range of degree programs in agriculture, education, engineering, forestry, design, biological sciences, physical sciences, and textiles. In addition, it has a school of liberal arts which offers degrees at the master's level. In 1973 the library housed 550,330 volumes, enrollment totaled more than 14,000 students, and the faculty numbered 843.

The University of North Carolina at Chapel Hill offers a broad choice of degree programs at all levels in the fine arts, humanities, natural sciences, and social sciences, as well as in the professional fields of business, education, journalism, law, library science, social work, and health sciences, including dentistry, medicine, nursing, pharmacy, and public health. In 1973 the library contained more than 2,271,000 volumes, enrollment was more than 19,000, and the faculty numbered 1725.

In 1973 the combined libraries of the University of North Carolina contained more than 5,000,000 volumes, total enrollment was more than 90,000 students, and the faculty numbered more than 5550 members.

NORTH CASCADES NATIONAL PARK, area of scenic interest in Whatcom, Skagit, and Chelan counties, Wash. The park features spectacular

scenery, with glaciers and deep canyons characteristic of the rugged Cascade Range, and facilities for hiking, camping, fishing, and boating. The park is divided into two units by the new Ross Lake National Recreation Area. The newly established Lake Chelan National Recreation Area adjoins the park on the southeast. The northern unit of the park is centered on the Picket Range and includes Mt. Shuksan (9038 ft.). The southern unit contains the Eldorado Peaks and Mt. Logan (9080 ft.). The park is administered by the National Park Service (q.v.).

NORTH CHICAGO, city of Illinois, in Lake Co., on Lake Michigan, 35 miles n.w. of Chicago, and adjoining Waukegan on the n. and Great Lakes United States Naval Training Station on the s. North Chicago is a manufacturing center, with extensive industrial establishments. Its industries include pharmaceuticals, metal products, stone, clay, glass, building materials, motors, boats, printing and office supplies, paper products, tanning, chemicals, and hospital supplies. In 1937 there was a sit-down strike at a steel plant in North Chicago which led to the 1939 ruling by the Supreme Court of the United States that such strikes were illegal. Pop. (1960) 22,938; (1970) 47,275.

NORTHCLIFFE, Viscount. See HARMSWORTH, ALFRED CHARLES WILLIAM, VISCOUNT NORTHCLIFFE.

NORTH DAKOTA, one of the West North Central States of the United States, bounded on the n. by the Canadian provinces of Manitoba and Saskatchewan, on the e. by Minnesota, on the s. by South Dakota, and on the w. by Montana. The geographic center of the North American continent is in Pierce County in the north-central part of the State. North Dakota is approximately rectangular; it measures about 350 mi. from e. to w. and about 200 mi. from n. to s.

Area (17th State in rank)	70,665 sq. mi.
Land	69,873 sq. mi.
Inland water	1392 sq. mi.
Population	(1970, 45th in rank) 617,761
	(1960, 44th in rank) 632,446
	(1950) 619,636
Altitude	750 ft. to 3506 ft.
Capital	Bismarck (1970) 34,703
Largest city	Fargo (1970) 53,365
Entered Union (39th State)	Nov. 2, 1889
Nickname	The Flickertail State
Motto	Liberty and Union, Now and Forever, One and Inseparable
	"North Dakota Hymn"
	wild prairie rose
	western meadowlark
Song	
Flower	
Bird	

THE LAND

North Dakota falls into three well-defined topographic areas, which extend beyond the boundaries of the State. These areas are the valley of the Red R. of the North, the Drift Prairie, and

The capitol of North Dakota, in Bismarck, is distinguished by its skyscraper tower. The statue in the foreground commemorates the pioneer families of North Dakota.

North Dakota State
Soil Conservation Committee



the Missouri plateau. The valley of the Red R., occupying the e. third of the State, and the Drift Prairie, occupying the central third, form part of the central lowlands of the U.S. The Missouri plateau, occupying the w. third of the State, forms part of the Great Plains. The three topographic areas are demarcated by steep escarpments, ranging from 300 to 400 ft. in height. The Drift Prairie is a treeless, rolling plain covered by glacial deposits of rocks, gravel, and sand. To the n. of the Drift Prairie are the Turtle Mts., a region of low hills and lakes. The section of the Missouri plateau lying between the Missouri R. and the Drift Prairie is known as the Coteau du Missouri; the part lying w. of the Missouri R. is called the Missouri Slope. The entire region is a semiarid, irregular plain, containing many isolated buttes as well as the dry beds of ancient lakes. In the s.w. part of the Missouri Slope are the Badlands (q.v.), an area of vividly colored buttes and mesas formed by landslides and the erosive action of the Little Missouri R. The mean elevation of the State is approximately 1900 ft. above sea level. White Butte (3506 ft.), in the Badlands, is the highest point in North Dakota. The lowest point (750 ft.) is at Pembina in the Red R. valley.

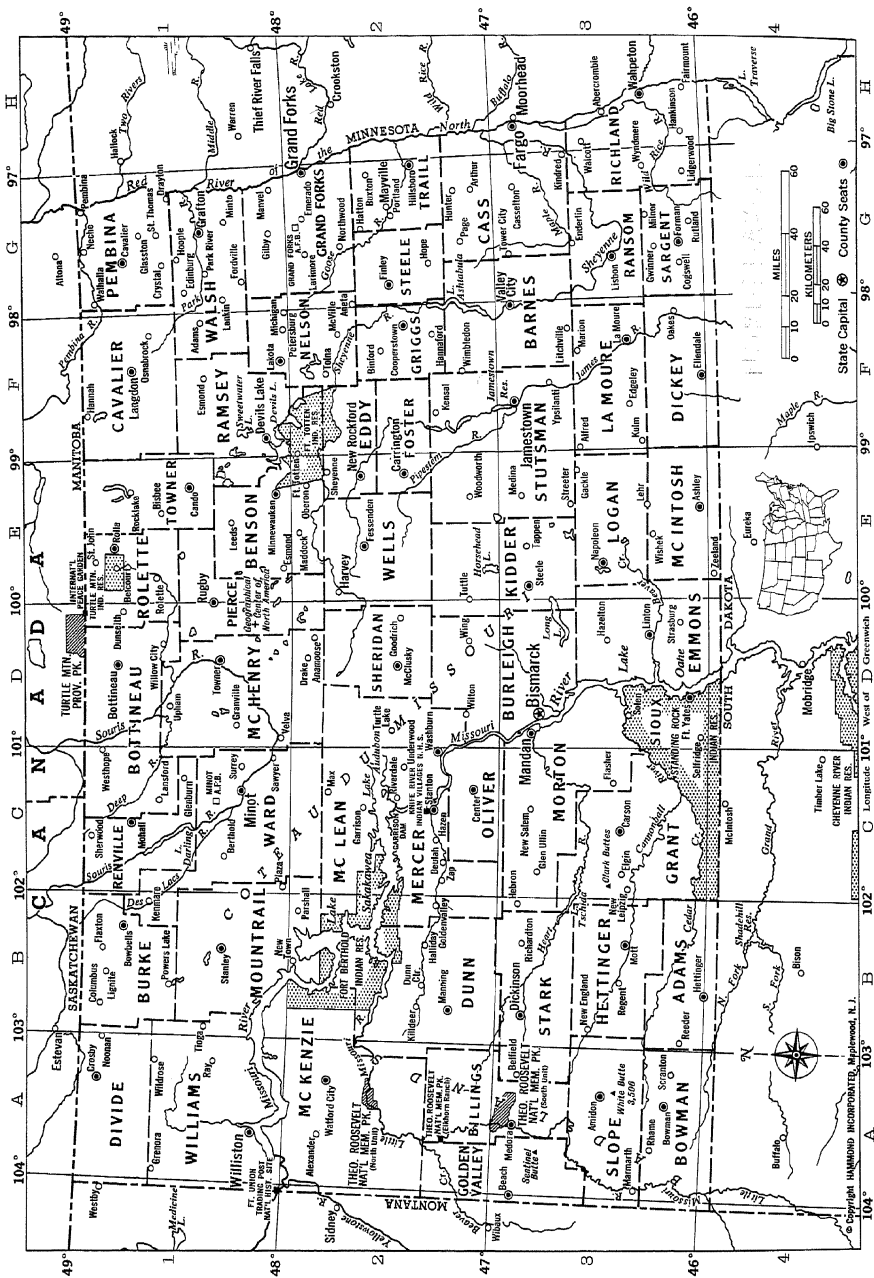
Rivers and Lakes. The two main drainage systems of the State are the Red R. of the North, which forms the border with Minnesota, and its tributary the Sheyenne R.; and the Missouri R., which flows from the n.w. boundary through the central and s. part of the State. Among the tributaries of the Missouri are the Little Missouri, Knife, Heart, and Cedar rivers. Garrison Reservoir (609 sq.mi.) and Oahe Reservoir (partly in South Dakota) are part of the Missouri River Basin Project. Another man-made lake is Lake Ashtabula, also called Baldhill Reservoir, on the Sheyenne R. The natural lakes of North Dakota

are chiefly in the n. and n.e. Among the largest is Devils Lake, a saline lake between Ramsey and Benson counties.

Climate. North Dakota has short, hot summers, with periods of prolonged high temperatures, and very cold winters, with zero readings on many days. Humidity is usually low in summer, mitigating the heat. The highest temperature recorded in the State was 121° F. (at Steele); the lowest, -60° F. (at Parshall). Precipitation, more than three quarters of which falls between April and September, averages 19 in. annually in the e., 16 in. in the central part of the State, and 15 in. in the w. Average annual snowfall is 32 in., with the greatest amount in the n.e. and the least in the s.w. The average annual number of days with measurable precipitation is 89 at Williston, 96 at Bismarck, 99 at Fargo, and 101 at Devils Lake. Severe thunderstorms are often accompanied by high winds, and tornadoes occur on an average of about ten per year.

Climate	Bismarck	Williston
Normal temperatures (in ° F.)		
January maximum	19.1	19.3
January minimum	-2.8	-2.8
July maximum	84.3	84.0
July minimum	57.3	56.1
Annual	41.4	40.9
Normal precipitation (in inches)		
Wettest month	3.58	3.25
Driest month	.44	.49
Annual	16.16	14.33
Latest frost	May 11	May 14
Earliest frost	Sept. 24	Sept. 23
Mean number of days between latest and earliest frosts	136	132

Plants and Animals. North Dakota has the smallest forest area (about 600 sq.mi.) of any State. The largest stands of trees are in the Turtle Mts. and on the escarpment between the Red R. valley and the Drift Prairie. The most common species are aspen, green ash, box elder, and bur



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oak. Dogwood, Juneberry, and wild roses are found along small streams almost everywhere in the State. The highbush cranberry grows thickly throughout the Red R. valley. The State has many varieties of wild flowers, including the wild prairie rose, pasqueflower, wild parsley, harebell, oxeye, coneflower, scoria lily, American vetch, and prairie clover.

North Dakota once was the habitat of vast herds of bison; their few survivors are protected in game refuges. The only big game found in the State at present are two species of deer. Small, furbearing animals such as raccoon, mink, foxes, rabbits, beaver, and skunks are common. Other common small mammals are the northern chipmunk, red squirrel, gopher (or flickertail, for

which the State is nicknamed), and white-tailed jackrabbit. In the extreme w. plains region prairie dogs and coyotes are common. Bird life is abundant; species include the swallow, blackbird, and several varieties of larks, robins, and sparrows. The State is famous for its game birds, such as the ring-necked pheasant, sage hen, grouse, wild goose, wild duck, and grebe. The fish population of the rivers and lakes has been reduced by droughts; however, fish hatcheries and other measures have been taken to propagate native varieties, such as the sucker, carp, perch, land-locked salmon, pike, rock bass, and sunfish.

Parks, Forests, and Other Places of Interest.

Theodore Roosevelt National Memorial Park,

NORTH DAKOTA

in two units near Watford City and Medora, is a badlands region along the Little Missouri R., part of the Elkhorn Ranch of the 26th United States President. The International Peace Garden, near Dunseith, is shared with Manitoba and commemorates the friendly relations and unfortified borders of the U.S. and Canada. The numerous parks maintained by the State include Fort Abraham Lincoln State Park, near Mandan; Lake Metigoshe State Park, near Bottineau; and Turtle River State Park, near Larimore, on the shore of the extinct Lake Agassiz.

Most places of historical interest in North Dakota are associated with early exploration or Indian battles. The Verendrye (q.v.) monument, at Sanish, commemorates the French-Canadian explorer. Fort Abercrombie, 45 mi. north of the South Dakota border, was the first Federal fort in the State. Whitestone Battlefield State Memorial marks the site of a major battle (1863) between U.S. troops and Sioux Indians.

Sports. With a series of reservoirs and a number of rivers, North Dakota provides varied fishing. Among native species are walleye and northern pike, sauger, rock bass, sunfish, crappie, yellow perch, bullhead, and catfish. Rainbow trout have been planted. Ice fishing is popular, and northern pike, perch, ling, and sauger are taken. Game animals and birds hunted in North Dakota are white-tailed and mule deer, antelope (residents only), fox squirrel, cottontail rabbit, jackrabbit, Hungarian partridge, wild turkey, and ruffed, sharp-tailed, and sage grouse. Skiing is popular during the long winter season. Ski resorts have been established at Twilight Hills, near Bismarck, and Villa Vista, at Arvilla.

THE PEOPLE

According to the 1970 decennial census, the population of North Dakota was 617,761, a decrease of 2.3 percent from the 1960 population. The urban segment comprised 273,442 persons, 44.3 percent of the total, compared with 35.2 percent in 1960. The rural segment comprised 344,319 persons (55.7 percent of the total), compared with 64.8 percent in 1960. Ethnically, the 1970 population was distributed as follows: white persons, 599,485; nonwhites, 18,276, including 14,369 Indians, and a sprinkling of Negroes, Japanese, Chinese, Filipinos, and others. The percentage of native-born residents in 1970 was 97.0; of foreign-born, 3.0. The major countries of origin of the foreign-born, in order of rank, were the Soviet Union, Norway, Canada, and Germany. The 1970 population density averaged 8.8 per sq.mi., compared with 9.1 in 1960.

The chief cities are Bismarck, the capital and third-largest city, a center of mining, shipping,

and manufacturing; and, in order of population, Fargo, a rail hub and meat-packing center; Grand Forks, distribution center for a vast agricultural region, site of the University of North Dakota; and Minot, marketing center for the w. area of the State and E. Montana.

Indian reservations in North Dakota include Fort Berthold, occupied by the Gros Ventre, Arikara, and Mandan tribes; Standing Rock and Fort Totten, by the Sioux; and Turtle Mountain, by the Chippewa.

Education. The public-school system of North Dakota was established in 1889. Education is compulsory for all children between the ages of seven and seventeen.

ELEMENTARY AND SECONDARY SCHOOLS. In 1970 public elementary schools numbered more than 575 and public secondary schools, about 300. Enrollment in 1971 was about 98,000 in elementary and about 47,000 in secondary schools. Teachers in the public-school system in 1972 numbered about 4400 in elementary and more than 2650 in secondary schools. In 1970 private institutions included about 85 elementary schools and about 25 secondary schools; enrollment in 1971 was about 10,000 elementary and 4000 secondary students. Teachers in private schools numbered about 1050.

UNIVERSITIES AND COLLEGES. In the early 1970's North Dakota had thirteen institutions of higher education, three of which were private. University and college enrollment was about 30,000. State institutions include the University of North Dakota, North Dakota State University, and State colleges at Dickinson, Mayville, Minot, and Valley City. Private institutions are Assumption College, Jamestown College, and Mary College.

Cultural Institutions. Museums in North Dakota include the State Historical Society Museum and State museums at Camp Hancock Historic Site, both in Bismarck; Fort Abraham Lincoln State Park, Mandan; and the De Mores Chateau House, in Medora. The ranch home of President Theodore Roosevelt (q.v.), where he lived during the years 1884-86, is preserved near Medora.

THE ECONOMY

North Dakota has a diversified economy, with heavy dependence on agriculture. More than 21 percent of the State's workers are in agriculture. Nonagricultural workers are employed, in descending order, in wholesale and retail; government; service industries; manufacturing; construction; transportation and public utilities; and finance, real estate, and insurance. Tourism adds some \$270,000,000 annually to the economy.

Manufacturing. According to a recent survey of manufactures, production workers in North Dakota totaled 9200, a substantial increase over earlier years: in the mid-1960's there were only about 4500 production workers in the State. In the mid-1970's the largest groups were employed in the manufacture of nonelectrical machinery, in printing and publishing, in the food industries, and in the manufacture of stone, clay, and glass products. About 28 percent

industries in the State are petroleum, coal, sand and gravel, and natural gas liquids. Mineral production in the mid-1970's was valued at about \$202,000,000 annually. In that period, North Dakota ranked tenth among U.S. States in crude petroleum production (before the Alaska pipeline went into operation).

Energy. Generating plants in North Dakota, with a capacity of 1,700,000 kw., produced about 10.4 billion kw hours of electric energy annually



Baling alfalfa on a North Dakota farm.

U.S. Bureau of Reclamation

worked in the Standard Metropolitan Statistical Area (q.v.) of Fargo-Moorhead. The annual value added by manufacture (see VALUE) in the largest industries totaled \$105,300,000 for food and kindred products, \$89,500,000 for nonelectrical machinery, and \$31,800,000 for printing and publishing. The annual value added by manufacture was about \$323,900,000.

Agriculture. Agriculture is a major source of income in North Dakota, giving employment to nearly a quarter of the State's work force. About 59,000 persons work on some 40,500 farms covering about 41,600,000 acres. The average farm has about 1040 acres. The principal agricultural commodities, in descending order of value, are wheat, cattle, barley, and milk. Other important crops include hay and oats. In overall wheat production, North Dakota ranks second to Kansas; it leads the U.S. in production of the spring and durum varieties. It is also the leading State in production of barley. North Dakota ranks twenty-fourth among the States in total cash receipts from agricultural production. In the mid-1970's the total income from farming, including government payments, was \$1.68 billion, including \$1.17 billion from crops and \$484,362,000 from livestock.

Mining. North Dakota ranks thirty-second among the States in value of mineral production. The principal products of the extractive in-

in the mid-1970's. About 94 percent of the production and 91 percent of the capacity were publicly owned. A major source of power is Garrison Dam, on the Missouri R.

Forestry. The forest land of North Dakota consists entirely of hardwoods. The forest land, primarily under private ownership, comprises some 406,000 acres. It produces a net annual cut of sawtimber of some 7,000,000 bd.ft.

Transportation. The first railroad in North Dakota was the Northern Pacific, inaugurated on June 3, 1883. At present North Dakota has a total of about 5060 mi. of railroad line in operation. Rural and municipal roads total some 106,000 mi.; Federally assisted primary and secondary roads total about 18,771 mi., including 571 mi. in the Interstate Highway System. One international airline and 2 local or interstate lines provide service to North Dakota, and the State has 92 public and 106 private airports.

Communications. The first newspaper in North Dakota was the *Bismarck Tribune*, founded in 1873 and still being published. Today the State has 10 daily newspapers with a total circulation of 144,000 and 3 Sunday papers with a total circulation of 58,000. Among the leading papers are the *Fargo Forum*, the *Grand Forks Herald*, and the *Minot News*. Of 43 radio



Ice fishing on the Snake Creek Reservoir, part of Garrison Reservoir.
U.S. Bureau of Reclamation

stations operating in the mid-1970's, one of the oldest was KILO, established in 1923 in Grand Forks. There were thirteen television stations.

GOVERNMENT

North Dakota is governed under the constitution of 1889, as amended. Executive authority is vested in a governor, a lieutenant governor, an attorney general, and a secretary of state, all elected for four-year terms, and other elected and appointed officials. Legislative authority is exercised by the Senate, with forty-nine members elected for four-year terms; and the House of Representatives, with 113 members elected for two-year terms. The legislature meets biennially in odd-numbered years. The judicial system includes a five-member supreme court, district courts, and various lesser courts.

North Dakota is represented in the United States Congress by two Senators and two Representatives.

Local Government. North Dakota is divided into fifty-three counties, each governed by a board of commissioners elected for two-year terms. Urban communities with a population of 500 or more are governed usually by the mayor-council or commission form of government.

Voting Qualifications. Suffrage is extended generally to U.S. citizens eighteen years of age who meet the residence requirements (one year

in the State, ninety days in the county, and thirty days in the election district).

HISTORY

The first known exploration by a white man of the region comprising present-day North Dakota was made in 1738 by the French explorer Pierre Gaultier de Varennes, Sieur de la Vérendrye (q.v.). At that time about ten Indian tribes inhabited North Dakota, including the Mandan, Cheyenne, and Hidatsa Indians. In 1742-43 two sons of La Vérendrye passed through the region, but more than fifty years elapsed before it was visited by whites again. The first trading post within the region was established near the site of Pembina in 1797 by the British North West Company, a fur-trading company.

In 1803, by the terms of the Louisiana Purchase (q.v.) from France, the area came under United States sovereignty; Great Britain maintained, however, that the area belonged to Canada. In the following year the American explorers Meriwether Lewis (q.v.) and William Clark (see under CLARK) entered North Dakota and raised the American flag there for the first time; see LEWIS AND CLARK EXPEDITION. In North Dakota they also secured the services of the famous Indian interpreter and guide Sacagawea (q.v.), who accompanied the expedition to the Pacific Ocean.

U.S. Sovereignty. In 1818 Great Britain recognized American sovereignty over the region. The first permanent white settlement was sponsored by Thomas Douglas, Earl of Selkirk (1771-1820), a member of the Hudson's Bay Company, who founded a colony on the site of what is now Pembina in 1819. Hostile fur traders drove the colonists away. For decades thereafter the region continued to be inhabited only by Indians and fur trappers. The American Fur Company, owned by the financier John Jacob Astor (see under ASTOR), established Fort Union near the Missouri R. in North Dakota in 1828. For the next forty years Fort Union was the most important trading post in the region.

From 1805 to 1861 North Dakota was successively a part of the Michigan, Wisconsin, Minnesota, Missouri, and Iowa territories. In 1861 it became part of the newly organized Dakota Territory, which included present-day North Dakota, South Dakota, Montana, and Wyoming.

Several military outposts were established in the region after 1850 for the purpose of protecting the trading posts and restraining Indian attacks. Among these were Forts Abercrombie (1857), Rice (1864), Buford (1866), Ransom (1867), Seward (1872), and Yates (1878). Settlers began to move into the area as the network of

NORTHEAST BOUNDARY DISPUTE

forts was extended. With the completion in 1881 of the Northern Pacific Railway westward to the present North Dakota-Montana border, a new influx of settlers began.

The Indians resented both the railroad and the white settlers, whom they regarded as invaders. In 1876 the U.S. government launched a campaign to force the Indians onto reservations. In Dakota Territory occurred the massacre of George Armstrong Custer (q.v.) and his men; see *LITTLE BIGHORN, BATTLE OF*. The Sioux (q.v.), the most belligerent Indians of the area, surrendered in 1881 and were placed on reservations.

Homesteading and Recent Events. The Homestead Laws (q.v.) provided an incentive to settlement of the area. Homesteaders were granted 160 acres of land free of charge, provided that they occupied and cultivated their holding for five years. In 1882 the Dakota Territory was reduced to the area of present-day North Dakota and South Dakota. A year later Bismarck was designated as the territorial capital. Petitions were sent frequently to the United States Congress requesting both Statehood for the territory as a whole and its admission to the Union as two separate States. In 1889 Congress enacted legislation admitting the territory as the States of North Dakota and South Dakota. The period following admission to the Union was marked by conflict between the farmers and the Eastern financial interests that controlled the

railroads and the grain markets. The Nonpartisan League, a political party advocating State ownership of terminal grain elevators, flour mills, packing houses, and cold-storage plants, was founded in 1915. The league gained control of the State government in 1919 and effectuated much of its program, including the construction of a State-owned flour mill and elevator. The league remained politically dominant until World War II when its influence began to wane.

When mechanization caused widespread unemployment, many farmworkers moved to the cities and to other states. After 1951, oil became North Dakota's most important mineral, and development agencies began to attract new industries. The U.S. Air Force's Strategic Air Command (SAC) bomber bases further contributed to economic growth. Today, exploitation of North Dakota's mineral resources is expected to diversify the economy and counteract the steady decline in agricultural employment, although agriculture remains a major source of revenue. An extensive canal system drawing water from the Missouri R. promises to irrigate vast tracts of arable land by the early 1980's.

NORTHEAST BOUNDARY DISPUTE, long-standing dispute between the United States and Great Britain concerning the northeastern

The beautifully rugged Bad Lands of the Little Missouri River, drainage area in southwestern North Dakota.

North Dakota State Game and Fish Dept.



NORTHEAST PASSAGE

boundary line with eastern Canada. It arose, like the Northwest Boundary Dispute (q.v.), from the vagueness of the line laid down in Article II of the Treaty of Paris; see *PARIS, TREATY OF*. By this article the line was to run from the N.W. corner of Nova Scotia, northward from the source of the Saint Croix R. to the dividing range of the Québec Highlands and then to the N.W. head of the Connecticut R., down the Connecticut R. to the parallel of 45°, and w. along that parallel to the Saint Lawrence R. It was difficult to state exactly where the dividing line of the highlands lay, although it was clear that Great Britain wished that those highlands should form a buttress to the fortifications of Québec. This part of the boundary caused the most trouble. The location of the N.W. head of the Connecticut led to much dispute. Jay's Treaty (q.v.) settled what was meant by the Saint Croix line, but neither the boundary terms in the Treaty of Ghent (1814) nor the decision (1831) of William I (q.v.), King of the Netherlands, made the lines clear. The king had been chosen to arbitrate the dispute, but recommended a solution unacceptable to the U.S. The quarrel over the islands in Passamaquoddy Bay was easily settled (1817), and the U.S. obtained Mosse, Frederick, and Dudley islands. The Aroostook War, a bloodless controversy (1838-39) between New Brunswick and Maine, made both the U.S. and British governments wish for a definite boundary. See *AROOSTOOK*. Accordingly, Alexander Baring, 1st Baron Ashburton (1774-1848) was sent by Great Britain to Washington as a special minister, and after talks of an informal character with Secretary of State Daniel Webster (q.v.), arrived at a satisfactory solution, known as the Webster-Ashburton Treaty (1842). Great Britain secured the highlands and a circuitous route between Québec and Halifax; the U.S. secured seven twelfths of the disputed territory, and the right to carry timber down the Saint John R. In lieu of territory lost by Maine and Massachusetts, the U.S. gained Rouses Point on Lake Champlain.

NORTHEAST PASSAGE, water route that extends from the North Sea of Europe, along the arctic coast of Asia, and through the Bering Sea to the Pacific Ocean. The British began the quest for the Northeast Passage in 1553 with an expedition commanded by the arctic navigator Sir Hugh Willoughby (d. 1554), who sighted Novaya Zemlya (q.v.) and reached Lapland, where he died. During 1878-79 the Swedish explorer Nils Nordenskiöld (1832-1901) became the first to traverse the passage by rounding Cape Chelyuskin (q.v.) and reaching Yokohama, Japan. See *NORTHWEST PASSAGE*.

NORTHERN IRELAND, integral part of the United Kingdom of Great Britain and Northern Ireland, situated in the N.E. portion of the island of Ireland (q.v.). Northern Ireland is bounded on the N. and N.E. by the North Channel, on the S.E. by the Irish Sea, and on the S. and W. by the Republic of Ireland. It lies approximately between lat. 54° N. and lat. 55°15' N. and long. 5°30' W. and long. 8°10' W. It includes also Rathlin Island in the North Channel and several smaller offshore islands. Northern Ireland is also known as Ulster, because it comprises six of the nine counties which constituted the former province of Ulster (see *IRELAND*). The total area is 5238 sq.mi.

THE LAND

Northern Ireland has an extreme north-to-south extension of about 85 mi. and an extreme east-to-west extension of about 110 mi. The coastline is characterized by numerous irregularities. The major indentations are Lough Foyle in the N. and Belfast, Strangford, and Carlingford lagoons in the E. A striking feature of the N. coast is the Giant's Causeway (q.v.), a rock formation consisting of 40,000 closely placed, hexagonal pillars of black basalt.

The country consists mainly of a low, flat plain in the approximate center of which is Lough Neagh (153 sq.mi.), the largest lake in the British Isles. Other important lakes are Lough Erne and Upper Lough Erne. Apart from several isolated elevations, three major areas of considerable height are the Sperrin Mts. in the N.W., the Antrim plateau along the N.E. coast, and the Mourne Mts. in the S.E. The highest point in the country is Slieve Donard (2796 ft.), a peak in the Mourne Mts.

The chief rivers are the Foyle R., which forms part of the N.W. boundary and flows into Lough Foyle at Londonderry, and the Upper Bann and Lower Bann rivers. The former rises in the Mourne Mts. and empties into Lough Neagh; the latter flows out of Lough Neagh to the North Channel. Rivers are numerous and they include the Main, Blackwater, Lagan, Erne, and Bush rivers. Because of the generally flat terrain, drainage is poor, and the areas of marshland are extensive.

Climate. The climate of Northern Ireland is mild and damp throughout the year. The prevailing westerly winds from the Gulf Stream are largely responsible for the lack of extreme summer heat and winter cold. The average annual temperature is 50° F.; the July and January averages respectively are about 58° F. and about 40° F. Rainfall is distributed evenly during the year. The annual precipitation frequently exceeds 40



in. in the N. and is about 30 in. in the S. The level of humidity is high.

Natural Resources. The most valuable natural resources of Northern Ireland are its fertile soil and rich pasturelands. Natural waterpower is abundant. The chief minerals are chalk, basalt, granite, and peat. Bauxite, iron ore, and coal also are found in small amounts.

Plants and Animals. In general the plants and animals of Northern Ireland are similar to those of the island as a whole. The only distinctive plant is a species of wild orchid, *Spiranthes stricta*, found in the valleys of the Upper and Lower Bann rivers. Distinctive species of animal life include the pollan, a freshwater variety of whitefish found in Lough Neagh and Lough Erne.

THE PEOPLE

The majority of the people are of Scottish or English ancestry and are known commonly as the Scotch-Irish. The remainder of the population is Irish, principally native Ulstermen.

English is the sole official language. Unlike the Republic of Ireland, Northern Ireland does not encourage the use of the Gaelic language. See ENGLISH LANGUAGE.

Population. The population of Northern Ireland (official census, 1971) was 1,527,593. The population is almost equally divided between urban and rural dwellers. The density is 278 per-

sons per sq.mi. However, the population is unevenly distributed, with greater concentrations in the eastern half. The greatest density occurs in the county borough of Belfast, which has about 12,297 persons per sq.mi. County Fermanagh, which has about 78 persons per sq.mi., is the most sparsely populated area.

The capital and largest city of Northern Ireland is Belfast (pop. 1971, 360,150), which is surrounded by such substantial and growing industries as shipbuilding and the manufacture of textiles.

Political Divisions. Northern Ireland is divided into the six counties of Antrim, Armagh, Down, Fermanagh, Londonderry, and Tyrone, and the two county boroughs of Belfast and Londonderry (often the two cities are not considered county boroughs, but are included respectively in Antrim and Londonderry counties).

Religion. The population of Northern Ireland is predominantly Protestant. The largest single denomination, however, is the Roman Catholic. In the county borough of Londonderry and in the counties of Fermanagh and Tyrone, Roman Catholics constitute a majority. The largest Protestant denominations are the Presbyterian, the Church of Ireland, and the Methodist.

Unlike England, Northern Ireland has no es-

Donegal Place, one of the principal squares of Belfast.

UPI

NORTHERN IRELAND

tablished, or state, church. The Church of Ireland (see IRELAND, CHURCH OF), at one time a branch of the Church of England, was dissociated from it in 1871. About 71 percent of the adherents of the Church of Ireland live in Northern Ireland.

Education. Education is free and compulsory for children between the ages of five and fifteen. The educational system is essentially similar to that of England, and students may transfer between the schools of Northern Ireland and those of England without loss of educational credits. See GREAT BRITAIN: *Education*.

ELEMENTARY AND SECONDARY SCHOOLS. In the early 1970's Northern Ireland had about 1200 primary schools, annually attended by approximately 210,000 pupils, and 7300 teachers. Secondary schools numbered about 250, including 13 technical schools. The combined annual enrollment of secondary schools was approximately 135,000.

UNIVERSITIES AND COLLEGES. Northern Ireland has two universities: Queen's University of Belfast, and the New University of Ulster, which opened in 1968. The total annual university enrollment is about 8100; faculty members number about 800. Two colleges, the College of Technology and the Presbyterian College, a theological school, are located in Belfast.

Culture. Northern Ireland did not exist as a separate political entity until 1921, when a treaty with England partitioned Ireland into the Irish Free State (now the Republic of Ireland) and Northern Ireland, which maintained full status in the United Kingdom. Originally culturally indistinguishable from the remainder of Ireland, with the waves of colonization from England and especially Scotland during the 17th century,

the northern section (known as Ulster) evolved its own cultural identity. Religion is the most significant factor in the difference between life in Northern Ireland and in the Republic of Ireland. In addition, Northern Ireland is considerably more urbanized and industrialized than the Republic of Ireland. Many Protestants of the North consider their more advanced economy proof of their superiority over the dreamy, other-worldly Catholic Irish. Much deep-rooted and long-standing antipathy exists between the two countries, and a guarded border is still maintained. In keeping with its strong ties with England, the central national festival is Orange Day, July 12, which commemorates the victory of the Protestant William III, King of England over the Roman Catholic James II (qq.v.), the deposed king, in the Battle of the Boyne in 1690.

Northern Ireland shares the early cultural glories of all Ireland. To Ulster belongs one of the two great cycles of Irish myths that contain the exploits of Cuchulain and the tragic story of Deirdre. Despite a flourishing theatrical movement in Belfast and a good deal of literary activity, no Northern Irish writer has approached the achievements of the writers of the Irish literary revival. For further information on culture see ENGLAND: *Libraries and Museums*; GREAT BRITAIN: *Art and Archeology*; IRISH LITERATURE.

THE ECONOMY

In general, the economy of Northern Ireland is integrated into that of Great Britain, and many aspects of the economy are under the jurisdiction of national agencies, such as the National Coal Board; see GREAT BRITAIN: *The Economy*.

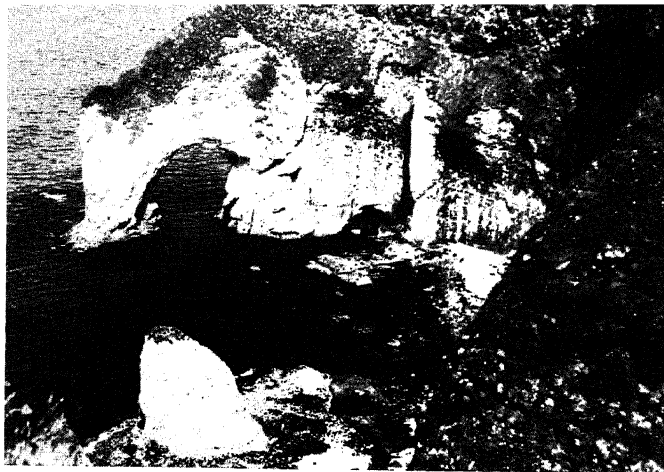
Agriculture. Small farms, averaging 40 to 70 acres in size, predominate in Northern Ireland.

Thatched cottages are a common sight in Northern Ireland. UPI



The Wishing Arch in County Antrim is one example of the many coves and inlets of Northern Ireland's coastline.

UPI



Generally the farms produce both crops and livestock. The annual agricultural output in the mid-1970's was valued at about \$542,800,000, of which livestock and livestock products accounted for about 80 percent. Livestock on farms numbered approximately 1,548,000 cattle, 926,000 sheep, 698,000 pigs, and 11,925,000 chickens.

The leading crops are flax, most of which is used in the domestic linen industry, oats and other animal feeds, and potatoes.

Forest and Fishing Industries. Northern Ireland is sparsely forested, but the state afforestation program made considerable progress in the 1960's. The average annual fish catch in the mid-1970's was about 15,620,000 metric tons. Saltwater fishing is centered on the east coast, principally off County Down; the most important species caught are whiting and scallops. There are freshwater fisheries in Lough Neagh, Lough Erne, and Upper Lough Erne; the species caught include salmon, trout, eel, and pollan.

Mining and Manufacturing. Mining and quarrying are relatively unimportant economic activities, employing only about 2600 workers in the mid-1970's. The chief minerals are basalt, chalk, limestone, and granite.

Manufacturing provides the largest single source of the gross national product. In the mid-1970's the industrial output of Northern Ireland was valued at about \$895,000,000 annually. Some manufacturers receive government grants for capital investment and occupy, at low rentals, factories built by the government.

The leading industries, in terms of employment, are the manufacture of textiles and clothing. Together these industries employed about 50,000 persons and had an annual net output valued at about \$328,510,000 in the early 1970's.

Linen is the most important textile manufactured; cotton cloth and fabrics woven of synthetic fibers rank next in importance. Shirts constitute the largest single type of apparel produced by value. Shipbuilding and the manufacture of aircraft also are major industries. The shipyards of Belfast are among the largest in the world, and annual ship production was more than 185,470 gross tons in the early 1970's. Other manufactures include textile machinery, tabulating machines, electronics equipment, processed food, liquor, tobacco products, and rope.

Commerce and Trade. The value of imports is generally slightly higher than that of exports. In the mid-1970's the average annual value of imports was about \$3.14 billion; the value of exports was about \$2.88 billion. About 90 percent of the trade is with Great Britain, and the currency of Great Britain is the legal tender of Northern Ireland. A large portion of the exports to Great Britain is transhipped to other countries, however. Northern Ireland exports linen goods, textiles, clothing, machinery, and food, notably meat, potatoes, and dairy products. Imports consist chiefly of raw materials and metals, fuel, produce, and an assortment of manufactured goods.

Transportation and Communications. Northern Ireland has about 14,430 mi. of roads; except for about 400 mi. maintained by the central government, the roads are maintained by the counties and county boroughs. Railroad trackage totals about 300 mi.

Daily steamship and airline services connect Belfast with the rest of the United Kingdom. The lower Bann Canal connects Lough Neagh with Coleraine.

Northern Ireland has three daily newspapers and numerous weekly newspapers.

NORTHERN IRELAND

Labor. The system of labor relations in Northern Ireland is based on the same principles as that of Great Britain. About 90 percent of trade unionists in Northern Ireland are members of trade unions with headquarters in Great Britain.

GOVERNMENT

Northern Ireland, an integral part of Great Britain, sends twelve members to the British House of Commons. The Government of Ireland Act, which was passed by the British Parliament in 1920 and was modified by several agreements between Northern Ireland and Great Britain, is the basic constitutional document. The act was intended as a means of providing home rule for Ireland through the establishment of two separate parliaments, one for Ulster and one for the rest of Ireland. The act, however, was accepted only by Ulster, or Northern Ireland. The act gave Northern Ireland local autonomy; the government of Great Britain retained control over defense, foreign policy, currency, tariffs, and communications. In 1972, however, because of religious strife, direct rule was reimposed. It was relinquished in 1973 and reimposed in 1974; see *History*, below.

Central Government. The nominal head of the Northern Ireland government is the governor, who is appointed by the British crown for a term of six years. The real executive power is vested, however, in the prime minister and cabinet. These officials resigned in 1972, when Great Britain reinstated direct rule.

HEALTH AND WELFARE. Health, welfare, and social-security benefits and services differ only in minor detail from those of Great Britain, but are administered independently by the Northern Ireland Council of Social Service and the Northern Ireland Ministry of Health and Social Services. See GREAT BRITAIN: *Health and Welfare*.

Legislature. The legislature consists of the upper house, or Senate, and the lower house, or House of Commons. The Senate is composed of twenty-four members elected by the House of Commons and of the lord mayors of Belfast and Londonderry. Elected senators serve for six years; half are elected every three years. The House of Commons is composed of fifty-two members popularly elected every five years, or more often in the event of dissolution of the house. In general, legislative power is exercised by the House of Commons, and the Senate is limited to delaying legislative enactments.

Political Parties. Northern Ireland has two major political organizations, the Unionist Party and the Nationalist Party. The former, which in general resembles the Conservative Party of Great Britain, favors free enterprise and the

maintenance of ties with Great Britain; the latter advocates dissociating from Great Britain and uniting with the Republic of Ireland.

Judiciary. The highest courts are the Supreme Court of Judicature of Northern Ireland (consisting of the High Court of Justice and the Court of Appeal) and the Court of Criminal Appeal. Appeals in some instances may be taken from these courts to the House of Lords in Great Britain, rather than to the Court of Criminal Appeal. The lower courts include county courts with criminal and civil jurisdiction and summary criminal courts for minor offenses.

HISTORY

For the history of Ireland prior to 1920, see IRELAND: *History*. In 1920, when Ireland was granted home rule, six counties of the province of Ulster, northernmost of the four Irish provinces, were given the opportunity to separate politically from the rest of the island and preserve a close relation with Great Britain. Under the Government of Ireland Act of 1920, the six counties became a separate political division, with its own constitution. The Irish Free State (later Éire, and now the Republic of Ireland) did not accept the separation of Northern Ireland as permanent, but Northern Ireland consistently refused to consider a reunion. The boundary between Northern Ireland and the Irish Free State was fixed permanently in 1925.

Northern Ireland, as an integral part of the United Kingdom, participated in World War II against the Axis powers (qq.v.). In addition to supplying military personnel, the country produced ships and aircraft and cloth for military uniforms. The ports of Belfast and Londonderry were of strategic importance to Allied shipping. Belfast was damaged considerably by air raids.

Northern Ireland After World War II. After the war Northern Ireland, paralleling a trend in Great Britain, passed much legislation providing for the expansion of social-welfare benefits. When, in 1949, Éire withdrew completely from the Commonwealth of Nations, becoming the Republic of Ireland, the partition of Ireland became a major consideration in both divisions. In the elections in Northern Ireland in 1949, the Nationalist Party, which supported union with the Republic, was decisively defeated by the Unionist Party. On May 17 the British Parliament passed a bill retaining Northern Ireland as a part of the United Kingdom until the local parliament decided otherwise.

Persistent economic difficulties through the postwar years led to the formation, in 1955, of a Northern Ireland Development Council, which met with considerable success. By the mid-

A picturesque sight in rural Ireland, an itinerant knife grinder on his two-wheeled donkey cart.

UPI



1960's, it was able to announce the founding of some 230 new firms and the expansion of about 200 existing firms since 1945.

Irregulars of the outlawed Irish Republican Army (I.R.A.) initiated, in December, 1955, a campaign of terrorism on behalf of the union of Northern Ireland with the Republic of Ireland, bombing British military installations in County Fermanagh. Acts of terrorism continued through 1957 and 1958, although gradually becoming less frequent in the early 1960's. The government of the Republic of Ireland condemned terrorism as a means of achieving unification with Northern Ireland and, in 1962, the I.R.A. announced that it had abandoned the campaign.

Growing Violence. By the late 1960's religious division and violence had increased in Northern Ireland, particularly in Belfast. In 1968 Roman Catholics, long discontented over what they felt to be discrimination in employment, housing, and parliamentary representation, organized a civil-rights movement. A leader of the Catholic cause was Bernadette Devlin McAliskey (1947-), who during 1969-74 served as a member of the British House of Commons. Her role in riots in Londonderry in 1969 led to her arrest and a subsequent jail sentence, which in turn resulted in further violence. Moderate Protestants recognized a need for governmental reform, but a right-wing faction of the ruling Unionist Party called for the resignation of the centrist prime minister, James D. Chichester-Clark, later Baron Moyola (1923-), for failing to deal stringently with the Catholic opposition. In early 1971 he was succeeded as prime minister by the former minister of development, Brian Faulkner (1921-77).

After a sharp escalation of violence the British in early 1972 abolished the Northern Ireland parliament and reimposed direct rule. In March, 1973, in a referendum largely boycotted by Catholics, the voters of Northern Ireland chose to retain ties with Great Britain rather than join

the Republic of Ireland. On Jan. 1, 1974, the British once more relinquished direct control, and a fifteen-member Northern Ireland executive, made up of both Protestants and Catholics and led by Faulkner, took office. This intercommunal government was opposed by extremist Protestants, who in mid-1974 spearheaded a general strike to protest the arrangement. The work stoppage resulted in widespread disruption, and in May Great Britain again imposed direct rule. Violence increased in the following years, but abated somewhat in 1977. Two Belfast women, Mairead Corrigan (1944-) and Betty Williams (1943-), were jointly awarded the Nobel Peace Prize for 1976 for working to reconcile Northern Ireland's religious communities.

NORTHERN LIGHTS. See AURORA.

NORTHERN TERRITORY, territory of the Commonwealth of Australia, bounded on the N. by the Timor Sea, the Aratura Sea, and the Gulf of Carpentaria, on the E. by Queensland, on the S. by South Australia, and on the W. by Western Australia. The territory consists mainly of low tablelands with altitudes of less than 2000 ft. The N. coast is a lowland area. Mount Zeil (4955 ft.), in the Macdonnell Ranges at the southern part of the territory, is the highest peak. The climate is tropical. Precipitation, which occurs mainly between November and April, ranges from 60 in. annually along the coast to about 10 in. in the interior. Marsupials, alligators, snakes, water buffaloes, and tropical birds are common. The most important forms of vegetation are grasses, mangroves, and eucalyptus trees. Darwin is the capital, largest city, and principal port. Total area, 520,280 sq.mi., of which 94,025 sq.mi. is reserved for aborigines; pop. (1971 census) 85,500, including about 18,000 aborigines.

Cattle raising is a primary economic activity. The territory is rich in minerals, with gold, silver, copper, uranium oxide, and manganese ore produced in significant quantities. Despite the lack

NORTH GERMAN CONFEDERATION

of water and the presence of numerous insect pests, the government has made successful efforts to develop farming. Peanuts are the chief commercial crop.

The territorial government is headed by an administrator appointed by Australia and aided by a legislative council of seventeen members, partly appointed and partly elected.

NORTH GERMAN CONFEDERATION, union of independent German States north of the Main R., formed in 1867 under the leadership of Prussia (q.v.) through the agency of the Prussian foreign minister, Otto von Bismarck (q.v.). Prussia had defeated Austria in the Seven Weeks' War (q.v.) of 1866. It next moved to establish a confederation of north German States under Prussian leadership. The North German Confederation replaced the Germanic Confederation, a union of thirty-nine German States under Austrian leadership that had been established (1815) by the Congress of Vienna (see VIENNA, CONGRESS OF) at the end of the Napoleonic Wars (q.v.). Twenty-two German States adhered to the North German Confederation. According to the agreement, each retained its own government, but submitted its military forces to the control of the confederation; the commander in chief of the combined armies was the king of Prussia. A legislative body was created; its president was the king of Prussia, but the duties of the office were performed by a chancellor, who was responsible only to the king.

Alliances were entered into between the North German Confederation and the important States to the south of the Main, namely, the Kingdom of Bavaria, the Grand Duchy of Baden, and the Kingdom of Württemberg, under which these States agreed to place their military forces under command of the king of Prussia in case of war against the confederation. The North German Confederation was an important step toward the unification of Germany, finally achieved in 1871 at the end of the Franco-German War (q.v.). After their victory in this war, the States of the North German Confederation and all the remaining States of Germany were combined to form the German Empire. The constitution of the confederation was adopted with slight modification as the constitution of the empire.

See GERMANY: *History*.

NORTH HAVEN. See NEW HAVEN.

NORTH ISLAND. See NEW ZEALAND.

NORTH KOREA. See KOREA.

NORTH LAS VEGAS, city of Nevada, in Clark Co., about 2 miles N. of Las Vegas. Pop. (1960) 18,422; (1970) 36,216.

NORTH LITTLE ROCK, city of Arkansas, in Pulaski Co., on the Arkansas R. opposite Little Rock, with which it is connected by a bridge. The city has stockyards and rail shops, and its industries include textile milling, food processing, sawmilling, cottonseed-oil processing, creosoting, and the manufacture of furniture and wood products, chemicals, wallpaper, boxes, mineral wool, and steel and stone products. The annual Arkansas Livestock Show and Rodeo is held in the city in October. An attempted settlement on the site, De Cantillon, failed in 1839. In 1856 Argenta was settled; later it was combined with adjoining Baring Cross and reincorporated. The city's name was changed in 1917. Pop. (1970) 60,040.

NORTHMEN. See NORSEMEN.

NORTH MIAMI, city of Florida, in Dade Co., on Biscayne Canal, 9 miles N.E. of Miami. It is the site of the State armory and an antique-arms museum. Incorporated in 1926 as Miami Shores, a name since applied to another community to the S., the city was renamed in 1931. Pop. (1960) 28,708; (1970) 34,767.

NORTH MIAMI BEACH, city of Florida, in Dade Co., bordering on Maule Lake and the Oleta R. and crossed by the Glades Canal, 11 miles N.E. of Miami. It is the site of an old Spanish fort and a wax museum. The city was formerly called Fulford. Pop. (1960) 21,405; (1970) 30,723.

NORTH OLMSTED, city of Ohio, in Cuyahoga Co., about 12 miles S.W. of central Cleveland of which it is a suburb. The city has some manufacturing. Pop. (1960) 16,290; (1970) 34,861.

NORTH PLAINFIELD, borough of New Jersey, in Somerset Co., about 2 miles N.W. of Plainfield. Primarily residential, the borough has some manufacturing. It is the site of Mount Saint Mary College, founded in 1905. Settled in 1736, the borough was incorporated in 1885. Pop. (1960) 16,993; (1970) 21,796.

NORTH PLATTE, city in Nebraska, and county seat of Lincoln Co., between the North Platte and South Platte rivers, 280 miles W. of Omaha. The city is a railroad division point, with extensive railroad shops, and is the center and shipping point of an irrigated agricultural area producing sugar beets, hay, and livestock. Industrial establishments in North Platte include flour mills, grain elevators, and meat-packing plants. Farm equipment is manufactured. North Platte was settled in 1867. Pop. (1960) 17,184; (1970) 19,447.

NORTH PROVIDENCE. See PROVIDENCE.

NORTH RHINE-WESTPHALIA, State in West Germany, bounded on the N. and N.E. by the

State of Lower Saxony, on the e. by the State of Hesse, on the s. by the State of Rhineland-Palatinate, and on the w. by Belgium and the Netherlands. Dusseldorf is the capital. Other important cities are Essen, Cologne, Dortmund, and Bonn, the federal capital. The n.w. part of the State is a lowland, which rises in the n.e. into the hilly Teutoburger Wald (q.v.). The e., s., and w. parts are rolling uplands, which in the w. reach an elevation of 2625 ft. The uplands are cut by a series of valleys, of which the Rhine, Ruhr, and Möhne are the most important. The main rivers, the Rhine, Ems, and Weser, flow in a s. to n. direction. Area, 13,119 sq.mi.; pop. (1971 est.) 17,137,800.

North Rhine-Westphalia is the most industrialized and most populous State in West Germany. Coal mining, coke production, pig-iron production, and steelmaking, the chief industries, are centered on the Ruhr Valley, which has the largest reserves of bituminous coal in Western Europe. Other industries are refining and the manufacture of textiles, chemicals, and machinery. The State also produces about one third of the electricity of West Germany. Extensive agricultural areas are found throughout the State. The Rhineland (q.v.) is known for its wine production. Cereals, potatoes, and beets are grown throughout Westphalia (q.v.). Dairy farming and cattle and hog raising are also important. Because of the well-known cathedrals and the castles along the Rhine R., tourism is a major industry.

Under the 1950 constitution, the State is governed by a cabinet, headed by a minister-president. The cabinet is responsible to the popularly elected diet. The State is divided into six administrative districts.

History. The Rhine area was the homeland of numerous German tribes who successively fought the Celts and other German peoples, the Romans, and the Franks. Merovingian and Carolingian (qq.v.) rulers used the Rhineland as a base for penetrating Germany in the 6th through the 9th century. After the breakup of the Carolingian dynasty, a number of separate bishoprics and duchies emerged. These small states fell prey to their stronger neighbors: France moved into Lorraine in the 16th century and into Alsace (qq.v.) in the 17th century; also in the 17th century Brandenburg (q.v.) gained a foothold in Westphalia and gained Cleves and Mark. Although the attempts of Louis XIV (q.v.), King of France, to extend his control were frustrated, the French Revolution and the Napoleonic Wars (qq.v.) helped to consolidate many of the small states. The left bank of the Rhine was

ceded to France in 1801. Further changes came with the creation of the Confederation of the Rhine (q.v.) in 1806 and the kingdom of Westphalia in 1807. Although the Congress of Vienna of 1814–15 undid much of this partition, France, Prussia, and Bavaria gained new areas. Prussia acquired Westphalia between 1815 and 1817 and annexed various Rhineland areas following the Seven Years' War (q.v.). In the 19th century the region became highly industrialized.

After World War I, Allied forces occupied the Ruhr and other parts of the Rhineland. In 1930 the last Allied troops left the Rhineland, and in 1936 German troops reoccupied the area. During World War II, the Ruhr area was very heavily bombed. In 1946 the State was created out of Westphalia and the northern part of the Rhine province; Lippe was added in 1947.

NORTH RIDING. See YORKSHIRE.

NORTHROP, John Howard (1891–), American biochemist, born in Yonkers, N.Y., and educated at Columbia University. He began his career in 1916 as an assistant in chemistry at the Rockefeller Institute for Medical Research in Princeton, N.J., and was a member of the institute from 1924 to 1962. From 1937 to 1939 he served successively as a lecturer in chemistry at Johns Hopkins and Columbia universities, and he was Hitchcock professor of chemistry at the University of California from 1939 to 1959. In 1941 he became an official investigator of the National Defense Research Committee. Northrop's most notable contribution to the field of biochemistry was his successful isolation of several enzymes (q.v.) and virus proteins; he further demonstrated that these substances were chemical compounds whose structure and functions could be determined by chemical methods. For this work he shared the 1946 Nobel Prize in chemistry with the American biochemists James Batcheller Sumner and Wendell Meredith Stanley (qq.v.). He is the author of *Crystalline Enzymes* (1939).

NORTH SEA, (Lat. *Germanicum Mare*), part of the Atlantic Ocean (q.v.) between the E. coast of Great Britain and the continent of Europe. The Strait of Dover, with the English Channel (q.v.), forms the s. link with the Atlantic; see DOVER, STRAIT OF. The greatest width of the North Sea is 400 mi., its greatest length, about 600 mi., and its area, about 222,000 sq.mi. A number of large rivers flow into the s. part of the North Sea; the chief of these are the Elbe, Weser, Ems, Rhine (which is joined at its mouth by the Meuse), and Scheldt on the Continent, and the Thames and Humber in Great Britain. The mean depth of the s. portion is about 100 ft., near the middle

NORTH STAR

it is 250, and in the N. 400 ft. The sea reaches its greatest depth, 2654 ft., off the coast of Norway. The Dogger Bank occupies a large portion of the S.-central part of the sea, with a depth of 60 to 100 ft., the surrounding depths being 150 to 200 ft. The tides of the North Sea are very irregular, because two tidal waves enter it, one from the N. and one from the S.

Rain and fog occur at all seasons, and the violent N.W. storms blowing toward the shoals on the S.E. coast make navigation dangerous, especially along the coast of the peninsula of Jutland (q.v.). North Sea fisheries provide support for inhabitants of the surrounding countries. By means of the Nord-Ostsee Canal (q.v.) ships enter the Baltic Sea (q.v.) without making the longer passage N. around Jutland.

NORTH STAR, or **POLESTAR**, conspicuous star in the Northern Hemisphere, located closest to the point toward which the axis of the earth is directed, thus roughly marking the location of the north celestial pole; see **STARS**. The polestar has been used by navigators throughout recorded history for charting navigation routes and is still used for determining true azimuth and astronomic latitude; see **ASTRONOMY**; **LATITUDE AND LONGITUDE**; **NAVIGATION**: *Celestial Navigation*. The positions of the celestial poles change as the earth's axis moves with the earth's precessional motion (see **ECLIPTIC**), and as the north celestial pole assumes different positions among the constellations, different stars become the North Star.

During the past 5000 years the line of direction of the North Pole has moved from the star Thuban, or alpha (α) Draconis, to within one degree of the bright star Polaris, also known as alpha (α) Ursae Minoris, in the constellation Ursa Minor, which is now the North Star. Polaris is a star of second magnitude (q.v.), and is located at a distance of about 300 light years from the earth. It is easy to locate in the sky because the two stars opposite the handle in the bowl of the Dipper in the constellation Ursa Major, called the Pointers, point directly toward Polaris. See **CONSTELLATION**; **DIPPER, BIG**; **DIPPER, LITTLE**.

In the year 7500 the brightest star in the constellation Cepheus (q.v.) will mark the pole, and in the year 14,000 the star Vega (q.v.) will be the North Star.

NORTH TARRYTOWN. See **TARRYTOWN**.

NORTH TONAWANDA, city and port of entry of New York State, in Niagara Co., on the Niagara R., at the W. terminus of the New York State Barge Canal, 13 miles N. of Buffalo. It adjoins the city of Tonawanda (q.v.), with which it forms an industrial unit. Transportation facilities

include railroads, and an airport at Tonawanda. The cities share a fine harbor, with a developed waterfront of 7 mi. Traffic of the harbor is chiefly in imports of iron ore, limestone, and lumber from ports on the upper Great Lakes. The leading industries are machine shop metal trades, woodworking, and the manufacture of plastics, musical instruments, paper, chemicals, and paints. North Tonawanda was settled in 1809, incorporated as a village in 1865 and as a city in 1897. Pop. (1960) 34,757; (1970) 36,012.

NORTHUMBERLAND, Great Britain, northernmost county of England. The county is separated from Scotland on the N. and N.W. by the Tweed R. and Cheviot Hills, and borders the North Sea on the E. The terrain along the coast is level, and the hilly interior is indented by valleys. Northumberland is drained by the Aln, Coquet, and Tyne rivers. Agriculture and livestock raising are the chief occupations throughout the county. In the industrial S.E. section are coal mines, shipbuilding yards, and plants producing chemicals, iron and steel, and machinery. Newcastle upon Tyne (q.v.) is the administrative center. In Northumberland are remains of Hadrian's Wall (q.v.) and of Roman military roads. Area, 2019 sq.mi.; pop. (1971) 794,975.

NORTHUMBRIA, in Anglo-Saxon England, kingdom of the heptarchy established by Ida, King of Bernicia (d. 599), in 593 out of the two earlier kingdoms of Bernicia and Deira. It grew greatly in power during the reign of King Ethelfrith (593–617), became the strongest kingdom in the heptarchy under King Edwin (q.v.), and under King Oswald (605?–642), English martyr and saint, it was the champion of Christianity against the pagan, Anglo-Saxon kingdom of Mercia (q.v.). The separate existence of this kingdom was brought to an end by Egbert (q.v.), King of Wessex, and the first Saxon king recognized as sovereign of all England, in 827. The name survives in the modern county of Northumberland (q.v.).

NORTH VIETNAM. See **VIETNAM**.

NORTHWEST BOUNDARY DISPUTE, controversy between the United States and Great Britain concerning the boundary between the U.S. and the British colony of Canada. The dispute originated because the Treaty of Paris of 1783 established the boundary as a line extending west from the northwestern point of Lake of the Woods to the Mississippi R. The treaty negotiators used Mitchell's Map of North America to set the boundary; the map, however, depicted the northern source of the Mississippi 152 miles N. of its actual location. Great Britain and the U.S. disputed the boundary from 1792 until the

Convention of 1818 was accepted, setting the boundary at the 49th parallel, 152 miles N. of the Mississippi source. The agreement extended the northern boundary westward to the Rocky Mts.

The U.S. proposed to continue the line to the Pacific Ocean as a means of dividing the Oregon country between the two claimants. The offer was rejected by Great Britain which claimed it would give the Columbia R. to the U.S. The U.S. agreed that the two powers would occupy the Oregon territory jointly for ten years. During the administration of the American President John Tyler (q.v.), the British offered to accept the 49th parallel as far west as the Columbia R. and from there to follow the Columbia R. to the Pacific. The government of the U.S., however, declined. In the U.S. popular opposition by those who wanted to extend U.S. territory north to 54°40' N. gave rise to the slogan, "Fifty-four forty, or fight". The Democratic Party, in its national platform of 1844, asserted the right of the U.S. to the whole of Oregon. The dispute was settled by the Oregon Treaty in 1846, by which the boundary line was established at the 49th parallel to the middle of the channel that separates Vancouver Island from the continent, and south through the channel and the Strait of Juan de Fuca to the Pacific Ocean. Navigation of the channel and straits was to remain free and open to both parties. See PARIS, TREATY OF; WASHINGTON, TREATY OF.

NORTHWESTERN UNIVERSITY, coeducational privately controlled institution of higher learning, situated in Chicago and Evanston, Ill., chartered in 1851, and opened for instruction four years later; women were first admitted in 1869. The university is nonsectarian. Eight of the divisions of the university are located in Evanston, a suburb 12 mi. from Chicago, on a 160-acre campus stretching along the shore of Lake Michigan. They comprise the college of arts and sciences (founded 1855), the school of speech (1878), the school of music (1895), the graduate school of management (1908), the graduate school (1910), the Medill School of Journalism (1921), the school of education (1926), and the technological institute (1939, formerly the school of engineering). The remaining schools, located on the Chicago campus, are the school of medicine (1859), the school of law (1859), the school of dentistry (1891), and the evening divisions (1932). The degrees of bachelor, master, and doctor are granted. The university has connections with the Garrett Theological Seminary and the Seabury-Western Seminary; both institutions are located in Evanston. In 1973 the library contained a total of 2,400,000 bound

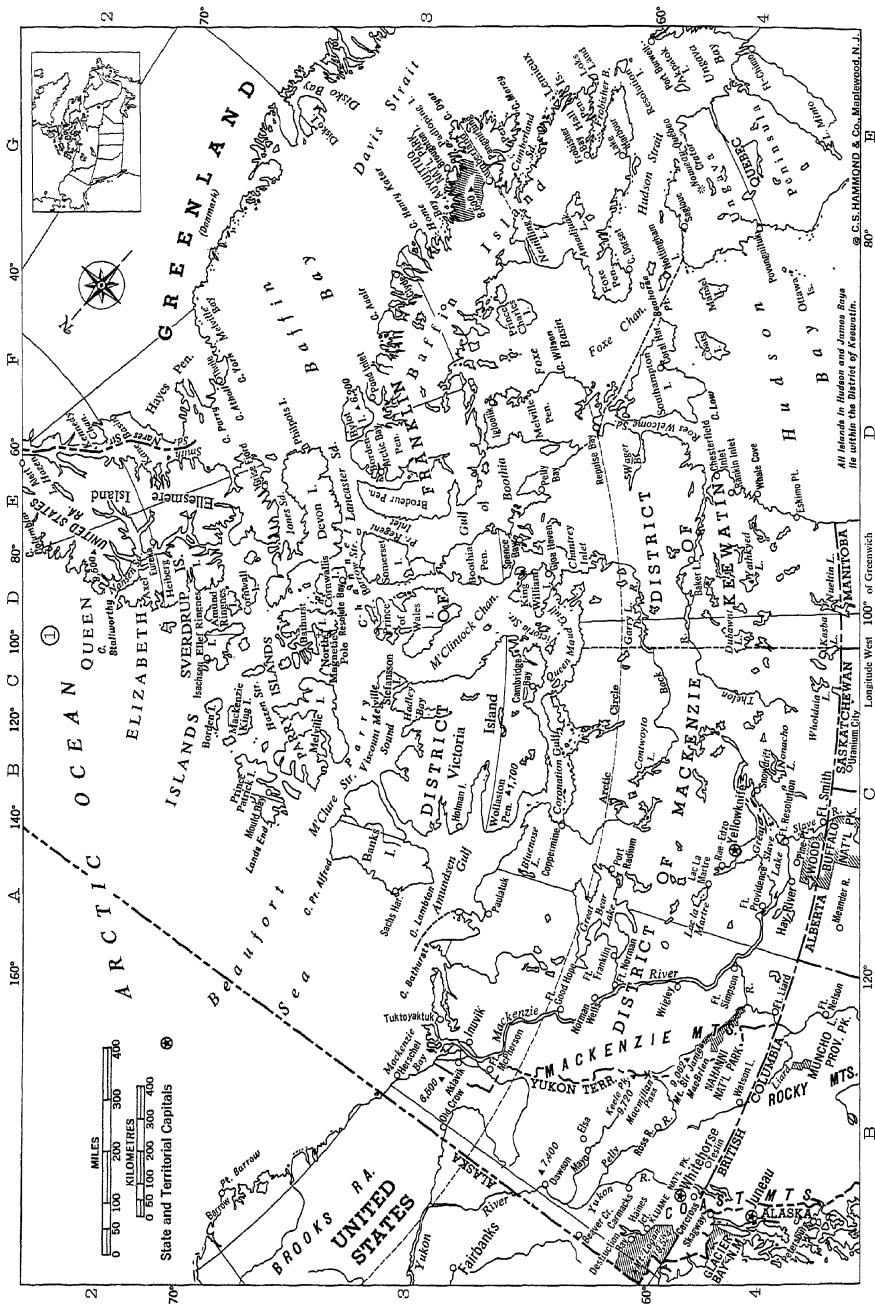
volumes. In 1973 the total enrollment in all branches of the university was 18,334, and members of the faculty numbered 2518. The university endowment was about \$279,228,000. Approximately 6500 undergraduates were enrolled at Northwestern University during the 1973-74 school year.

NORTH-WEST FRONTIER PROVINCE, province of Pakistan. The region is between Afghanistan and the Indus R. In 1849, following the Second Sikh War, the British seized control of the region, most of which was formed into frontier districts, and attached it for administrative purposes to the Punjab. In 1901 a British commission confined the new North-West Frontier Province mainly to the north of the Gomal R. In 1947, after the termination of British control over India, the province became a division of newly independent Pakistan. From 1955 to 1970 it was part of the consolidated province of West Pakistan. Its capital is Peshawar (q.v.). Pop. (1975 est.) 11,531,000.

NORTHWEST PASSAGE, route for ships between the Atlantic Ocean and the Pacific Ocean via the marine waterways of N. Canada and the coastal waters off N. Alaska. Efforts to discover a navigable sea route from Europe to China and India by way of the ice-clogged waters of arctic North America began in the 1490's with the voyages of John Cabot (see *under* CABOT). He was unsuccessful, as were many later attempts. The ill-fated expedition (1845-48) of Sir John Franklin (q.v.) unknowingly came close to finding a route. Franklin's ships disappeared, and during attempts to find them the existence of a Northwest Passage was proved (1850-54). Finally, in 1903-06, Roald Amundsen (q.v.) made the first transit of the passage. In 1969 a United States icebreaking oil tanker, the *Manhattan*, became the first large vessel to negotiate the passage. See ARCTIC; NORTHEAST PASSAGE.

NORTHWEST TERRITORIES, administrative region of Canada, encompassing all of the country N. of lat. 60° N., except Yukon Territory and the northernmost extremity of Québec Province; it is bounded on the N. by the Arctic Ocean, on the N.E. by Baffin Bay (q.v.), on the E. by Baffin Bay and Hudson Bay (q.v.), on the S. by the provinces of Manitoba, Saskatchewan, Alberta, and British Columbia, and on the W. by Yukon Territory. The only city is Yellowknife, which is also the capital of the Northwest Territories. The region comprises an extensive mainland, a large complex of islands lying between the mainland and approximately lat. 83° N., the islands in Hudson Strait, and the islands in Hudson, James, and Ungava bays. The region is di-

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vided into three administrative units, namely the District of Keewatin, which occupies the e. third of the mainland, excepting the Melville Peninsula and the Boothia Peninsula (q.v.); the District of Mackenzie, which occupies the w. two thirds; and the District of Franklin, which includes the islands n. of the mainland and Melville and Boothia peninsulas; *see also* BAFFIN ISLAND. The total estimated area is 1,305,000 sq.mi., of which 51,000 sq. mi. is freshwater surface.

THE LAND

Northwest Territories comprises three main topographical regions. Two of the regions, a plateau and an area of plains, are located on the mainland; the third region consists of the great complex of islands, the Arctic Archipelago, which lies n. of the mainland.

The plateau region, which covers approximately the e. two thirds of the mainland, is part of the Canadian Shield (q.v.), or Laurentian Plateau, a massive, rocky upland. The region is known as the Barren Grounds; the Barren Lands; or the tundra, that is, a treeless plain with permanently frozen subsoil. The plateau is a rolling expanse varying in elevation from several hundred feet to 1000 ft. above sea level.

West of the plateau, and occupying the re-

mainder of the mainland, lie the Western Interior Plains, or lowlands, which are an extension of the great Interior Plains of North America. The Western Interior Plains terminate in the w. in the Mackenzie Mts., which extend into the Yukon Territory. The highest peak on the mainland is Mt. Sir James MacBrien (9062 ft.).

The major islands of the Arctic Archipelago (together with the area in square miles) are Baffin (195,928), Ellesmere (82,119), Victoria (83,896), Banks (27,038), Devon (21,331), Melville (16,274), Axel Heiberg (16,671), and Prince of Wales (12,872). In general the islands to the e. are greater in elevation than those to the w. The e. islands are mountainous; plateaus dominate the central islands; and the islands of the s.w. and n.w. are largely lowlands. The United States Range is on Ellesmere Island; some peaks on the island are nearly 9000 ft. high. Baffin Island has peaks more than 6700 ft. in height.

Rivers and Lakes. The Northwest Territories encompasses numerous bodies of water. Notable lakes in the plateau region include Dubawnt, Baker, Yathkyed, Nueltin, and Maguse. Among the important rivers are the Back, Dubawnt, and Kazan. The lowland region is traversed by the Mackenzie River (q.v.) system, which extends for 2635 mi., about 1200 mi.

NORTHWEST TERRITORIES

within the Northwest Territories. The chief rivers of the system are the Slave R., which flows N. from Alberta and empties into Great Slave Lake (q.v.; 10,980 sq.mi.), and the Mackenzie R., which rises in Great Slave Lake and flows N. to the Arctic Ocean. Tributaries of the system include the Liard R.; the system also includes Great Bear Lake (q.v.; 12,275 sq.mi.), the largest lake of the Northwest Territories.

Climate. The climate is predominantly cold and rigorous, for much of the Northwest Territories lies N. of the Arctic Circle. The mainland often has much lower extreme temperatures than does the Arctic Archipelago.

The region is divided into two main climatic zones by the so-called tree line, which extends diagonally across the mainland approximately from the S.E. to the N.W. corner. Northeast of the line lies a treeless arctic zone. To the S.W. stretches a subarctic region that lies within the coniferous-forest region of North America; most of the trees are stunted in growth.

In general, the Mackenzie R. valley, which lies in the coniferous-forest region, experiences the least severe weather. Summer temperatures average about 60° F.; in winter the average monthly temperatures range from -15° to -25° F. Frost-free days annually total about 88. Recorded temperature extremes in the N. part of this area are 94° and -68° F.

In the N. mainland outside of the Mackenzie R. valley and in the Arctic Archipelago the mean July temperature is about 48° F. Winter temperatures, which generally vary from about -15° to -30° F., occasionally fall to -60° F. The number of frost-free days varies from 60 at Frobisher Bay on S. Baffin Island to few or none throughout the N. islands and E. mainland.

Precipitation on the mainland varies from about 13 in. in the S. to about 9 in. in the N.; about half of the total falls in the form of snow.

In the Arctic Archipelago total precipitation varies from about 15 in. in the S.E. to less than 2 in. in the W. and N.W. More than two thirds of the precipitation is snow. The total annual snowfall is 35 to 60 in. on the mainland and 15 to 97 in. in the Arctic Archipelago.

Plants. The flora of the Northwest Territories is chiefly arctic and subarctic; see TUNDRA. The region generally comprises a treeless plain along the N. and the islands of the Arctic Archipelago. Among characteristic vegetation are tussock, lichen, arctic lupine, heath, white marsh marigold, lyme grass, and many other species of a widely distributed circumpolar group.

Animals. Mammals native to the Northwest Territories include the Barren Ground caribou

and the musk-ox. Furbearing animals include the fur seal, muskrat, Arctic white fox, beaver, marten, mink, and white bear.

THE PEOPLE

The population of Northwest Territories, which according to the latest official census (1976) is 42,609, is made up principally of Indians, Eskimo (Inuit), and persons of European birth or descent. Approximately two thirds of the inhabitants are Indians and Eskimo, and one third is white.

About 70 percent of the white population and most of the Indians live in the subarctic part of the District of Mackenzie; the former are concentrated in settlements, and the latter are scattered throughout the forests of the district. The Indians are divided into various groupings, among which are the Slave, Hare, Yellowknife, Ojibwa (q.v.), and Dogrib tribes. The Eskimo live in the arctic area, where they are dispersed chiefly among the mainland coasts and the S. parts of the Arctic Archipelago.

The major population center is the city of Yellowknife (1976 pop., 8256), the territorial capital. Other communities include the towns of Hay River (3268), Inuvik (3116), Fort Smith (2288), and Pine Point (1915), and the village of Frobisher Bay (2320).

Education. Education in the Northwest Territories was managed by the education division of the Department of Indian and Northern Affairs until 1968, when the Mackenzie zone district superintendent became the director of education for the Territories. In 1969 a territorial department of education was established with its own operating budget and staff. The department, located in Yellowknife, is responsible for the administration of all schools except for the Yellowknife public and separate schools and the Rae-Edzo school. Under the revised education ordinance, smaller communities are playing a larger role in managing their schools while still retaining government financing.

In the mid-1970's there was an annual enrollment of about 12,500 students in some 68 elementary and secondary schools in the Northwest Territories. An adult training facility offering programs in business, trades, dental therapy, and teacher education is located in Fort Smith. There are no universities in the Territories.

THE ECONOMY

Mining, fur trapping, and fishing are the major economic activities, in the order listed. The outlook for fur trapping improved in the mid-1970's because of higher prices for pelts; the annual value of production was about \$2,750,000.



The gold-mining city of Yellowknife, on Great Slave Lake, is the capital of the Northwest Territories.

Shostal Associates

Electric power produced in the Northwest Territories is small because of the sparse population. According to the latest government statistics, total annual installed generating capacity was about 142,500 kw in the mid-1970's. Of this total, 45,600 kw came from hydroelectric power and 96,900 from thermal power.

Agriculture. Because of the limitations imposed by the climate, agricultural activity is restricted to small farms and truck gardens in the District of Mackenzie. The majority of food products are imported by air transport from the Prairie Provinces of Canada.

Many of the widely scattered Indians and Eskimo retain close ties with the land. Herds of caribou provide an important source of food and clothing, and fishing is a major activity.

Fishing. In the mid-1970's, according to latest government statistics, about 200 persons were annually employed in primary fishing operations. The annual landed value of all products of fisheries was about \$2,500,000. The chief commercial fishing site is Great Slave Lake. The principal catch is lake trout and whitefish, which are taken in both summer and winter. Subsistence fishing is vital to the Eskimo living in the Arctic Archipelago.

Mining. According to government statistics, in the mid-1970's annual mineral production in the Northwest Territories was valued at \$213,000,000. All but \$28,000,000 of this total was accounted for by metallic minerals, the most important being zinc, lead, gold, and silver. Zinc production was valued at \$120,000,000 in 1976.

Most mineral activities are in the vicinity of Great Slave Lake. Deposits of gold and silver are located near Yellowknife. The development of the vast high-grade base metal deposits at Pine Point has greatly increased the value of mineral production since 1954. Copper and silver are mined at Port Radium on Great Bear Lake, and lead and zinc at Nanisivik on Strathcona Sound. Scheelite has been mined at Tungsten near the Yukon boundary since the early 1970's. Oil and natural gas are produced at Pointed Mountain, in the same region. In the mid-1970's the Northwest Territories ranked first among Canada's provinces in production of scheelite and third in lead, gold, and zinc. There was a 60 percent increase in the value of mineral production in the Territories during the 1970's.



A scenic view of Pangnirtung Fjord. One of the many picturesque inlets on Baffin Island, the fjord extends from Cumberland Sound, in the eastern part of the island. Located on the fjord is Baffin's most sizable trading post, Pangnirtung. The name means "place of the caribou stag" in the language of the Eskimo.

Photo Researchers

Forestry. The Arctic Archipelago is virtually treeless. Forests of balsam, birch, pine, poplar, and spruce are found in the District of Mackenzie. In the mid-1970's, about 1,740,000 cu.ft. of wood was cut in the Territories and the Yukon, and 5,238,000 bd.ft. of lumber was produced.

Tourism. The region is visited by about 21,000 persons annually, who spend about \$11,000,000. Among the chief tourist attractions are the scenery and the cultures of the northern peoples.

Transportation. Transportation is chiefly by water and air routes. In the District of Mackenzie heavy goods are transported mainly by water, and chiefly over the 1200-mi. Mackenzie R. system. Ice restricts the river navigational season to about four months. Goods brought downstream to the mouth of the Mackenzie R. are transhipped for distribution along the arctic coast as far E. as Boothia Peninsula. The arctic coasts E. of the peninsula are in some cases visited only once a year by ocean freighters and by icebreakers sent from Canadian ports.

Scheduled flights to numerous settlements are provided by companies operating out of Edmonton, Alberta; Churchill, Manitoba; and Montréal, Québec. Yellowknife is the main center for nonscheduled flights by so-called bush planes to isolated regions. Frobisher Bay on S. Baffin Island has an international airport for planes flying the northern route between Europe and W. North America. Mail service is provided almost exclusively by air.

In 1966 the 377-mi. Great Slave Lake Railway from Roma, Alberta, to Hay River was completed, with a branch line to Pine Point. This transportation link ensured the development of the large mineral deposits in the area.

In the mid-1970's the Northwest Territories had some 1000 mi. of development roads, and plans were under way for a program to bring all potential areas of resource development within

200 mi. of the nearest permanent road.

Communications. Since 1958 the Northwest Territories has been served by the Northern Service, a radio service connected with the Canadian Broadcasting Corporation (C.B.C.), which broadcasts in two Eskimo dialects and five Indian languages, as well as in French and English. It serves some 105,000 people in the two territories and in the extreme N. portions of the provinces. Most communities with a population of more than 500 receive live C.B.C. television broadcasts via the Canadian domestic communications satellite, Anik I, which went into service in 1973.

GOVERNMENT

In 1964 a separate office for the administration of the Northwest Territories was established by the Federal government in Ottawa. This was the nucleus for the development of a distinct territorial administration, which was transferred from Ottawa to the newly designated capital and seat of government, Yellowknife, in 1967. The new government initially had responsibility only for the District of Mackenzie; administration of the districts of Keewatin and Franklin was added in 1970.

Under the Northwest Territories Act of 1952, as amended, the chief executive officer is the Federally appointed commissioner. He is assisted in carrying out his duties by an executive committee made up of two appointed members—the assistant and deputy commissioners—and three members from the territorial council. Each of the latter, selected by their fellow council members, is responsible for the operation of one governmental department.

The legislature is the fifteen-member territorial council. Members of the council are elected by their constituents for four-year terms. The Northwest Territories elects two members to the House of Commons in Ottawa.

Local Government. The city and towns of the Northwest Territories have authority to license and oversee local businesses and possess some of the powers usually exercised by municipal councils in the provinces. The hamlets, although incorporated, have developmental forms of local government. Supervision of these municipalities is provided by the territorial government.

Voting Qualifications. The franchise is extended to all Canadian citizens of either sex who are more than eighteen years of age and who have lived in the Northwest Territories for at least a year. Indians and Eskimo have the franchise in both Federal and territorial elections.

HISTORY

From the year 1000 to 1350 Norsemen (q.v.) probably made many landfalls on the eastern shores of the Canadian arctic zone and it is believed that Scottish-born explorer Sir Henry Sinclair, Earl of Orkney (d. 1400?), landed on Baffin Island in 1398. The first official explorer of the region was the English navigator Sir Martin Frobisher (q.v.), who claimed Baffin Island for England in 1577. Henry Hudson, John Davis, William Baffin (qq.v.), Luke Foxe (1586-1635), Thomas James (1593?-1635?), and numerous other English explorers traversed the area of Hudson Bay and many of the northern islands from 1610 to 1632, in search of the Northwest Passage between Europe and the Orient. In 1670, the Hudson's Bay Company (q.v.) was given a fur-trading charter by the government of England for the entire Hudson Bay drainage area, then known as Rupert's Land. One of the company's employees, Canadian explorer Henry Kelsey (1670?-1729?), was the first white man to penetrate into the interior from Hudson Bay.

The Hudson's Bay Company and its rival, the

North West Company, were responsible for much of the exploration in the region during the 18th century. Peter Pond (1740-1807), an American explorer in the employ of the North West Company, mapped the region of Great Slave Lake from 1768 to 1788. Sir Alexander Mackenzie (q.v.), a Scottish explorer working for the same company, discovered and canoed down the Mackenzie R. to the Arctic Ocean in 1789. Later he headed west and crossed the mountains, becoming the first white man to reach the Pacific Ocean by land. In 1770-71, the British explorer Samuel Hearne (1745-92) of the Hudson's Bay Company traveled overland from Fort Churchill (in what is now Manitoba) to the mouth of the Coppermine R. on the Arctic Ocean.

The search for the Northwest Passage was continued during the 19th century. Many explorers in the employ of the Hudson's Bay Company and also many official expeditions sponsored by the British government explored most of the arctic region from 1800 to 1859. The noted British navigator Sir John Franklin (q.v.) explored more than 2000 mi. of the arctic coast and he was lost with his crew while seeking the passage in 1845. The remains of Franklin's ship and crew were not found until 1859; in the meantime about forty search vessels, sent at various times to find Franklin, brought back detailed descriptions of arctic waters.

From British to Canadian Sovereignty. In 1870, Rupert's Land and the North-Western Territory were transferred to Canada by the British government. All the islands in the North American arctic zone which had been claimed by Britain, were transferred to Canada in 1880. Portions of this vast region were used to form the province of Manitoba in 1870; the District of Keewatin in 1876; the districts of Franklin and Mackenzie in 1895; and the Yukon Territory in 1898. The

Two Eskimo hunters pose with the tools of their trade, rifles and a harpoon, on Baffin Island. Eskimo are among the ablest hunters in the world, wresting a livelihood from as stern an environment as has been faced by any human group. The seal, whale, walrus, and other animals they take provide them not only with food and clothing but with many other necessities.

Photo Researchers



NORTHWEST TERRITORIES

provinces of Alberta and Saskatchewan were formed from the remaining area in 1905 and the newly defined Northwest Territories emerged. In 1912 the boundaries of Manitoba, Ontario, and Québec were extended northward to Hudson Bay and Hudson Strait, and the present boundaries of the three districts of the Northwest Territories were established in 1920.

Oil was discovered at Norman Wells in 1920 and during World War II (q.v.) oil production was increased greatly under the Canal project, which was sponsored jointly by the United States and Canada. Pitchblende and silver were discovered in 1930 on the eastern shore of Great Bear Lake, and the radium and uranium from this area helped make Canada one of the principal world sources of fissionable material. In the Yellowknife area, on the northern shore of Great Slave Lake, gold was discovered in 1933 and is still one of the top four minerals in the territories. The most important mineral development occurred at Pine Point, on the south shore of Great Slave Lake. Large deposits of high-grade lead and zinc ores are being exploited and have increased enormously the value of mineral production of the Northwest Territories.

In recent years the Northwest Territories has experienced a great increase in education facilities and public health and welfare programs, as well as resources development. With the transfer of the seat of government from Ottawa to Yellowknife and the increase in political autonomy, provincial status is expected to evolve more rapidly.

A network of radar warning stations, maintained jointly by the U.S. and Canada, extends in part across the Arctic Archipelago and its adjacent waters. The network, which is known popularly as the Distant Early Warning (DEW) line, is designed to give ample warning in the event of enemy attack. See COAST DEFENSE: *Continental Air Defense*.

The strong demand for petroleum, crude oil, and natural gas, and the lack of major new discoveries in the Western Provinces prompted exploration along the Canadian frontier in the early 1970's. Major oil and gas discoveries in the Mackenzie R. delta near Tuktoyaktuk, and on Ellef Ringnes, Melville, and several other islands in the arctic have created much optimism about the future potential of this area as a source of petroleum.

In early 1973 the Canadian government announced the start of an all-weather highway to run from the Alberta-Northwest Territories border to Tuktoyaktuk on the Arctic Ocean, east of the mouth of the Mackenzie R. The road would

facilitate oil and natural gas exploration in the region. A Canadian-U.S. accord of April 20, 1977, permitting construction of the Alcan natural-gas pipeline from Prudhoe Bay, Alaska, through the Yukon Territory to the lower U.S., was a victory for environmentalists and natives of the Northwest Territories. They had influenced the defeat of an alternative route, along the Mackenzie R.

NORTHWEST TERRITORY, in American history, region that constitutes the present States of Ohio, Indiana, Illinois, Michigan, Wisconsin, and the eastern part of Minnesota, a total area of about 265,878 sq.mi. The area was ceded by Great Britain to the United States in 1783. On the basis of their early charters, Virginia, New York, Massachusetts, and Connecticut claimed the greater part of it. The other States refused to recognize these claims and insisted that the territory should belong to the country as a whole. New York ceded its claims in 1781; Virginia, in 1784; Massachusetts, in 1785; and Connecticut, in 1786. All of these colonies, however, reserved for special purposes certain lands from the cession. Virginia retained in southern Ohio a considerable area, known as the Virginia Military District, and Connecticut retained 3,250,000 acres, known as the Western Reserve, in northern Ohio.

On March 1, 1784, Thomas Jefferson (q.v.), then a member of the Continental Congress (q.v.), reported to Congress a temporary plan of government, but no plan was accepted until the Ordinance of 1787. The ordinance provided for the formation of not less than three, nor more than five, States. It defined the boundaries of these States and also forbade slavery in the territory and set at 60,000 free inhabitants the population requirement for statehood there. In October, 1787, General Arthur St. Clair (1736–1818), was appointed the first governor of the territory. In July, 1800, the western part of the territory was constituted into the District of Indiana; in January, 1805, Michigan Territory was created; in February, 1809, the Illinois Territory was organized; and in April, 1836, part of Michigan Territory was organized into the Territory of Wisconsin.

NORTON, Charles Eliot (1827–1908), American writer and educator, born in Cambridge, Mass., and educated at Harvard College. In 1846 he traveled to India on business for an Oriental trading firm managed by some of his uncles, and on his return trip he spent two years in Europe. He eventually became known as one of the foremost American interpreters and popularizers of European culture. His first published works were *Considerations of Some Recent So-*

cial Theories (1853), followed by a translation of *The New Life of Dante Alighieri* (1859) and *Notes of Travel and Study in Italy* (1860). During the American Civil War, he was an editor for the New England Loyal Publications Society. A frequent contributor to the *Atlantic Monthly*, he was coeditor, with American poet and essayist James Russell Lowell (see under LOWELL), of the *North American Review* from 1864 to 1868, and was one of the founders of *The Nation* in 1865. He was appointed a professor at Harvard University in 1873, and offered the first course in fine arts correlated with the study of cultural, social, and literary history. Six years later he formed the Archeological Institute of America, of which he was president for several years. In 1897 he retired from Harvard as professor emeritus. His later works include *Historical Studies of Church-Building in the Middle Ages* (1880), a prose translation (1891-92) of Dante's *Divine Comedy*, an edition of the *Poems of John Donne* (2 vol., 1895) and an edition of the *Poems of Mrs. Anne Bradstreet* (1897).

NORWALK, city of California, in Los Angeles Co., 14 miles s.e. of the city of Los Angeles. Industries include oil refining, aluminum and zinc casting, and the manufacture of wood and plastic products, construction machinery, and bathroom fixtures. Norwalk is the site of Cerritos College (1955; junior college). Settled in 1877 as Corvalis, the city was renamed shortly thereafter and incorporated in 1957. Pop. (1960) 88,739; (1970) 91,827.

NORWALK, city of Connecticut, in Fairfield Co., on Long Island Sound, at the mouth of the Norwalk R., 14 miles s.w. of Bridgeport, and 41 miles n.e. of New York City. Its industries are the manufacture of hats and shirts, pumps, electronic equipment, food, and optical equipment.

The site of the present city was purchased from the Indians in 1640, settled in 1649, and incorporated as a town in 1651. It was burned by British troops on July 12, 1779. Norwalk formerly included the communities of South Norwalk and Norwalk; in 1913 these were consolidated with East and West Norwalk, Winnipauk, and Rowayton to form the present city of Norwalk, which includes the village of Silvermine (an artists' colony), several islands, and vacation resorts. Pop. (1960) 67,775; (1970) 79,113.

NORWALK, city in Ohio, and county seat of Huron Co., about 15 miles s.e. of Sandusky. The city is in a rich agricultural area. Manufactures include food products, auto parts, furniture, and rubber and foundry products. Norwalk is the site of the Firelands Museum, which contains such household items of the early settlers as

newspapers, firearms, and clothing. The city was settled about 1817 and incorporated in 1881. Pop. (1960) 12,900; (1970) 13,386.

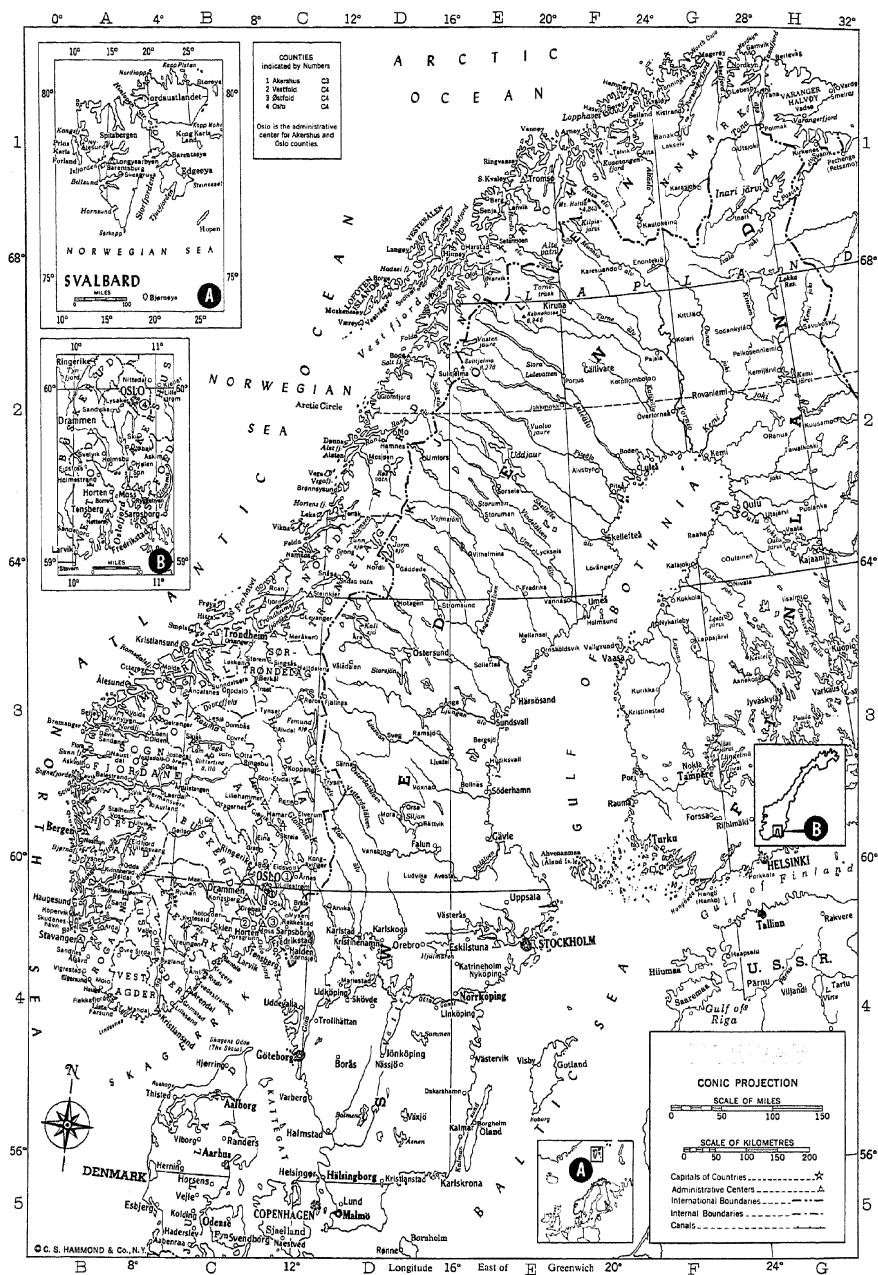
NORWAY (Norw. *Norge*), kingdom of northern Europe, occupying the western and northernmost portions of the Scandinavian peninsula. Norway is bounded on the n. by the Barents Sea, on the n.e. by Finland and the Soviet Union, on the e. by Sweden, on the s. by the North Sea and the Skagerrak, on the s.w. by the Atlantic Ocean, and on the w. by the Norwegian Sea. The country is situated between about lat. 58° N. and lat. 71°11' N. and long. 4°30' E. and long. 31°10' E. Somewhat larger than the State of New Mexico, Norway extends 1100 mi. in a n.e. to s.w. direction. It is 3¼ mi. in breadth at the narrowest point and 276 mi. in breadth at the widest point. The Norwegian coastline is about 1600 mi. long, excluding indentations, and about 12,000 mi. long if indentations and islands are included. The area of Norway is 125,247 sq.mi. In addition Norway owns the archipelago of Svalbard (q.v.) formerly Spitsbergen, with an area of 24,000 sq.mi.; Jan Mayen (q.v.), an uninhabited island north of Iceland with an area of 147 sq.mi.; and Bouvet Island, an uninhabited island in the South Atlantic Ocean with an area of 22 sq.mi. Norway also claims Peter I Island, off Antarctica, with an area of 96 sq.mi., and the portion of the Antarctic continent, lying between long. 20 W. and long. 45° E., known as Queen Maud Land.

THE LAND

About 75 percent of Norway consists of barren, mountainous land. The major mountainous regions are the Kjölén Mts. in the n. which extend e. into Sweden, and the Dovrefjell and Langfjell mountains in the s. The average elevation is 1650 ft.; the highest point is Mt. Glittertind (8104 ft.), situated in the Jotunheimen mountain region within the Langfjell. The highland surface is for the most part plateau-like in character and is from 2000 to 5000 ft. in elevation. Lowlands occur principally in the s.e. and in a region surrounding the city of Trondheim on the w. coast. A small, flat glacial plain extends s. of Stavanger.

The w. coast is indented with numerous fjords, some of which are more than 100 mi. in length. The coastal plains of the fjorded mainland and also of the offshore islands are extremely narrow; in places the rock walls rise abruptly from the sea to a great height. The s.e. coast has gentler slopes and well-developed river valleys. A naturally protected passageway for shipping is located between the screen of offshore islands, known locally as the skerry guard, and the mainland. The Glomma (q.v.) is the longest river of Norway. It is about 375 mi.

NORWAY



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The Geirangerfjord. Numerous fjords or steep-sided narrow inlets indent the long Norwegian coastline.

Blörn Bølstad-Peter Arnold

long and, with its tributaries, drains about 12 percent of the area of the country. In general, the rivers flowing in a s.e. direction are long, whereas those flowing in a s.w. direction are short and have many rapids and falls. Norway has numerous glacial lakes. Lake Mjøsa, with an area of 140 sq.mi., is the largest lake.

Geology. Norway is part of the old crystalline rock platform of n.w. Europe. Many changes took place during the long geologic history of the country, for example, the invasion of ancient seas and the deposition of sedimentary rocks. Old eroded surfaces have been uplifted considerable distances above sea level and have been reeroded several times. Continental glaciation scoured many areas bare of soil, rounded the landforms, cut the fjords, gouged basins for numerous lakes, and left rocky, infertile debris over most of the country. Several permanent ice fields remain.

Climate. The climate of Norway differs more sharply from the coast to the interior highlands than it does from n. to s. A marine climate is found on the w. coast, a continental type in the s.e., and a subarctic type in the n. and in the highlands. Despite the northern latitude, the climate of Norway is moderated considerably by westerly winds warmed by the Gulf Stream. Thus, the coastal ports of Norway are ice-free even as far n. as Kirkenes. The average temperature for February, the coldest month, is 24° F. at Oslo in the s.e., 34° F. at Bergen on the w. coast, and 27° F. in the northern portions of the country. The July average is 63° F. at Oslo, 58° F. at Bergen, and 55° F. in the n. Annual precipitation varies from 40 to 100 in. along the w. coast; it is 24 in. in the Oslo region and less than 20 in. in the far n. Except in the s.e., the maximum precipitation occurs during the winter season. Snowfalls are heavy in the highlands and the s.e. Cyclonic storms, which are not uncommon throughout the year, often reach hurricane force in the fall and spring. All of Norway has

long daylight periods in summer. The northern third of the country experiences periods of continuous daylight in the summer, a phenomenon referred to as the midnight sun; continuous darkness, however, prevails here in winter.

Natural Resources. The natural resources of Norway are somewhat limited; mountains, lakes, and wastelands make up almost 75 percent of the country. Its most valuable resources are its waterpower and the sea. Although not rich in mineral resources, Norway has some iron deposits, as well as deposits of copper, dolomites, pyrites, lead, silver, titanium, and zinc. In 1974 Norway began extracting substantial amounts of oil and natural gas from the vast reserves located in its continental shelf in the North Sea.

Plants and Animals. The natural vegetation of Norway varies with the climate, the rock structure, the elevation above sea level, the latitude, the amount of glaciation, and the type of soil. Heath and moorland vegetation dominate the poorly drained areas along the coast and the upland plateau surfaces above the tree line. Forests cover approximately 25 percent of the area of Norway. About three quarters of the trees are conifers, mostly pine and spruce. Birch is the most common among the deciduous trees. The best commercial timber is found on the slopes of the s.e. and in the Trondheim area. Wild berries, particularly blueberries and cranberries, grow in the woodlands. Cloudberry, little known outside Scandinavia, grow in the mountains.

The reindeer, polar fox, polar hare, wolf, wolverine, and lemming are common in the n. and in the higher mountainous areas. Elk, deer, fox, otter, and marten are found in the s. and s.e.

Both freshwater and saltwater fish are abundant in Norway. Salmon, trout, grayling, perch, pike, burbot, and carp are common in the streams and lakes. Herring, cod, halibut, mackerel, and many other species occur in important commercial quantities in the coastal waters.

Soils. Desirable clay soils occur in the glacial deposits in the s.e., in the marine deposits of former seas along the coasts, and in the alluvial deposits in the river valleys. Except in these regions, fertile soils are scarce in Norway.

Waterpower. Norway has abundant cheap hydroelectric power. Many waterfalls and swift streams provide power; permanent ice fields and interior lakes serve as natural water-storage basins. The average annual production of hydroelectric power in the early 1970's was 57,000,000,000 kw hours. Thus, Norway had the highest per capita production in the world and

ranked ninth in world production. Production capacity has been tripled since World War II but is only 30 percent of the estimated potential. The developed power is largely in the southern half of the country.

THE PEOPLE

The majority of Norwegians are descended from the Teutonic racial stock. Except for about 20,000 Lapps and a few people of Finnish origin called Kvaernerne, in the far n., the population is homogenous, with no significant minority groups. Norway is primarily an industrial society, with 52 percent of the population living in towns, and more than 50 percent are concentrated in the heavily industrialized southeastern lowlands.

Population. The population of Norway (1970 official census) is 3,888,305; the United Nations estimated (1971) 3,903,000. Norway has the lowest population density in continental Europe, with 31 persons per sq.mi. (U.N. est. 1970).

Political Divisions. Norway is divided into nineteen administrative units, called *fylker*, or counties. The city of Oslo constitutes a *fylke*. Each *fylke* is composed of a number of minor civil divisions called *herreds*, or rural districts, which are similar to townships in the United States.

Principal Cities. Oslo (q.v.), the capital and the leading industrial and most important commercial and shipping center, has a population (1971 est.) of 475,563. Bergen (q.v.), the cultural center of western Norway and second-largest city, has a population of 211,970. Trondheim (q.v.), with a population of 129,133, is an important center for trade, industry, and shipping.

Religion. About 96 percent of the population is Protestant and belongs to the Evangelical Lutheran Church of Norway. The church is supported by the state, and the clergy is nominated by the king. Complete freedom of religion is guaranteed, however, and other churches, with a total membership of about 150,000, include the Lutheran Free Church and the Methodist, Baptist, Adventist, and Roman Catholic churches.

Language. See NORWEGIAN LANGUAGE.

Education. The Norwegian national school system is relatively new because Norway was united with Denmark until 1814 and with Sweden from 1814 to 1905. As in the other Scandinavian countries, Norway organized its educational system in conjunction with the state religion, Lutheranism. Secondary schools under church influence had existed as early as the Middle Ages, however.

An attempt at compulsory education in Nor-

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way dates from a decree of 1739. A new compulsory-education law had to be enacted in 1827 to enable Norwegians to educate their children free from Danish influence.

The Norwegian educational system suffered greatly during 1940–44, when the country was occupied by Germany. The resistance of Norwegian teachers to indoctrinating their pupils in the ideology of the pro-German regime was acknowledged by the entire free world. After World War II Norway expanded its school system and introduced reforms to offer more educational opportunities. The Experiment in Education Act of 1954 set in motion changes in teaching methods and school structure, and extended the century-old compulsory-attendance law from seven to nine years.

Today education in Norway is in a transitional stage as a result of experimentation in teacher training and extension of educational opportunities, particularly for students in rural areas. Expansion of higher educational opportunities is under way. Among the most serious educational problems is the necessity for teaching two Norwegian languages, Nynorsk and the older Bokmål. Textbooks are available in both languages, and each school district makes its choice. High school students take core subjects, but also choose a vocational or academic program.

Education is free and compulsory for children between the ages of seven and sixteen. Norway has almost no illiteracy.

ELEMENTARY AND SECONDARY SCHOOLS. In the mid-1970's Norway had about 3400 primary schools, serving about 585,000 pupils. Some 275 secondary schools were attended by about 75,000 students. In addition some 105,000 students were attending special schools, as well as teacher-training colleges.

UNIVERSITIES AND COLLEGES. Norway has four universities and eight colleges of university standing. In the mid-1970's these were attended by about 41,000 students. Another 3800 Norwegians were studying at foreign universities.

Culture. Remnants of a very early culture are found in Norway. Early artifacts indicate that Norwegians have always been a seafaring people. The era of the Vikings, or Norsemen (q.v.), when Norwegians set out to conquer and explore the world, is chronicled in the sagas, the epic narratives of that period. A zest for luxuriant ornamentation, traced to the Viking age, lives on in Norwegian folk art, and is seen today in the modern sportswear of the country. The family and home are important segments in the life of the Norwegian, as is outdoor recreation.

LIBRARIES AND MUSEUMS. Norway has an extensive

system of public and school libraries, in addition to a large number of specialized libraries and government collections. The University of Oslo library, the largest in the country, has more than 1,950,000 volumes. Museums, with specialized collections in various fields, including history, applied and fine arts, and archeology, are located in Oslo, Bergen, Stavanger, Trondheim, and Tromsø. The Norwegian Folk Museum, located in Oslo, contains an outstanding collection of historical, anthropological, and other material on Norway.

LITERATURE. See NORWEGIAN LITERATURE.

ART. Many artifacts from the Viking age illustrate a rich pictorial and ornamental art in Norway as early as the 9th century. Norse artists of the period decorated ships, buildings, and household utensils with sumptuous wood carvings. During the Middle Ages these traditions were carried forward in the timber architecture of the "stave churches". The love of luxuriant ornamentation lived on in Norwegian folk art, which adapted Renaissance and baroque styles to its own tastes.

A new flowering of cultural life occurred in the 19th century, stimulated by national romanticism. Johan Christian Dahl (1788–1857), the first great painter of Norwegian landscapes, reflected a renewed contact with European tradition. In the early decades of the 20th century the expressionist painter Edvard Munch (q.v.), achieved international fame, and the dominant figure in sculpture was Gustav Vigeland (1869–1943), whose works reflected abstract influences from France and Germany.

MUSIC. An indigenous school of Norwegian music did not develop until the growth of the independent national state of Norway in the early 19th century. The Flemish during the 16th century, the Italians during the 17th century, and the Germans in the 18th and 19th centuries dominated the art expressions of Norway.

The first Norwegian composer of note was Halvdan Kjerulf (1815–68), who wrote songs and piano pieces based largely on German music of the time. The best-known Norwegian composer, Edvard Hagerup Grieg (q.v.), incorporated folk-music elements in his works. These elements included melodies and harmonic progressions based on ancient modes, or scales (see SCALE) and sustained-tone bass lines called drones, which are a characteristic feature of music performed on many Norwegian folk instruments. His wife and cousin, Nina Hagerup (1845–1935), was well known as a singer, particularly of her husband's songs. Two contemporaries of Grieg, Christian Sinding (1856–1941)

and Johan Svendsen (1840-1911), achieved lesser renown. Like Grieg, however, they wrote music combining German Romanticism and Norwegian folk elements. During the first half of the 20th century Norway declined in importance as a musical nation. Before and after World War II, however, the Norwegian soprano Kirsten Flagstad (q.v.) was an especially notable interpreter of Wagnerian operatic roles. At mid-century, the dominant musical influence from the Scandinavian countries was coming from Denmark and Sweden (qq.v.).

THE ECONOMY

Although the Norwegian economy is based on private enterprise, the government exercises a considerable amount of supervision and control. The country has one of the highest standards of living in the world. The merchant fleet, long the most important segment of the economy, is still of great importance. The 20th century has been a period of great industrial expansion for Norway, based primarily on the extensive and inexpensive waterpower resources of the country, but also aided by better utilization of other resources. National budget estimates for the late 1970's showed about \$10.7 billion in revenue and about \$13.8 billion in expenditures.

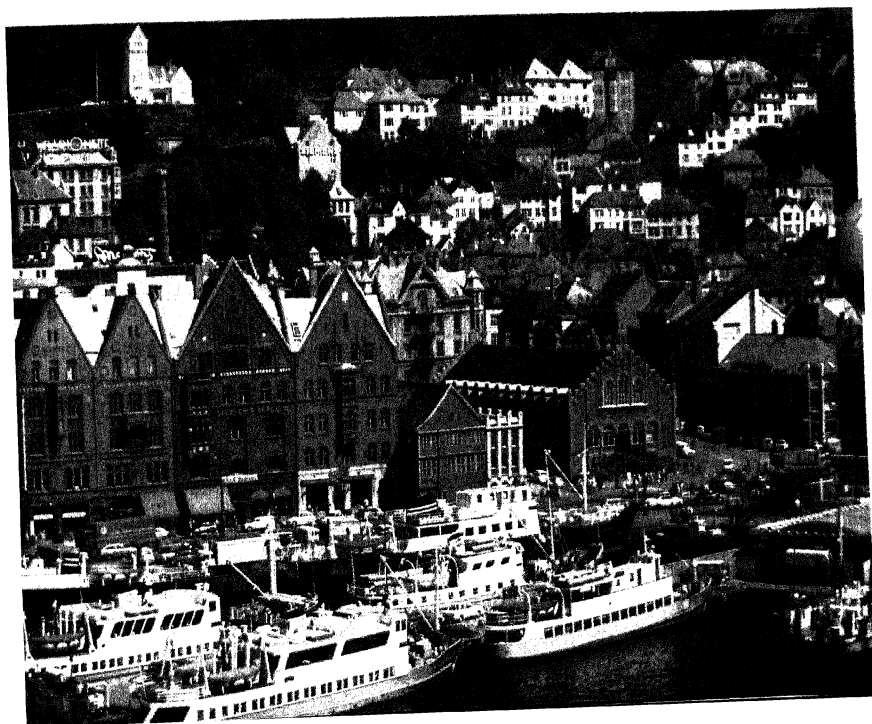
Agriculture. Agriculture figures significantly in the economy of Norway despite the handicaps of unfavorable climate, poor soil, rugged topography, and barren land. Only about 3 percent of the total area is cultivable. Farming is carried on chiefly in the s.e. portion of the country, in limited areas along the coast, and in the fjord valleys.

Only 10 percent of the work force is engaged in agriculture, compared with 33 percent in 1920. Farm production, however, continues to increase. Norwegian farms are small, family-owned tracts, averaging about 19.5 acres.

In general, farm production is primarily geared to the domestic market, but only milk, meat, eggs, and potatoes are produced in sufficient quantities to meet the domestic needs of the country. Dairying is the principal agricultural activity, but other important activities include fur farming and the raising of garden crops. Annual agricultural production in the mid-1970's totaled about 48,000 metric tons of wheat, 4200 tons of rye, 445,000 tons of barley, 260,000 tons of oats, 435,000 tons of potatoes, and 2,130,000 tons of hay. Livestock on farms

A section of the harbor at Bergen, Norway's principal shipping center and second largest city.

Susan McCartney-Photo Researchers



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included some 22,000 horses, 915,000 cattle, 1,640,000 sheep, 70,000 goats, and 670,000 pigs.

Forest and Fishing Industries. The forests of Norway are one of the primary sources of wealth. Forest industries contribute about 8 percent of exports. The productive forests are predominantly coniferous. About two thirds of the forest area is owned by farmers; of the remainder, about half is owned by the government and municipalities and the rest by industrial concerns. Annual production exceeded 340,000,000 cu.ft. in the mid-1970's.

Norway ranks fifth among fishing nations, accounting for about 4 percent of the total world catch. The Norwegian catch consists of capelin, herring, cod, haddock, mackerel, halibut, prawn, and coalfish. In the mid-1970's it totaled about 3,000,000 metric tons annually and was valued at \$476,000,000. The catch accounted for about 11 percent of the country's total exports.

Sealing and whaling are traditionally important segments of the economy. An international agreement designed to preserve the stock of whales has greatly curtailed the whaling industry, and it is now of minor significance to the economy.

Mining. Although Norway is not rich in mineral resources, it produces several minerals of considerable importance to its export trade. Production in the mid-1970's was about 2,660,000 metric tons of iron ore, 420,000 tons of coal, 475,000 tons of pyrites, 28,000 tons of copper concentrate, and 27,000 tons of zinc and lead. The richest iron deposits are located near Kirkenes, N. of Finland. Coal is mined on Svalbard.

Manufacturing. Industry, which dominates the Norwegian economy, has been greatly expanded and diversified since the end of World War II. It is based primarily on raw materials produced within the country, and on the extensive hydroelectric power resources.

The principal manufacturing region is in S.E. Norway, in and around Oslo. Secondary industrial centers are found on the S. and W. coasts.

In the mid-1970's some 410,000 people, about 24 percent of the working population, were employed in industry in about 14,350 manufacturing establishments. The pulp and paper, canning, chemical, and base metals industries produced the most important export manufactures.

The value added by manufacture in the most important industries totaled about \$600,000,000 for transport equipment; \$315,000,000 for chemicals; \$345,000,000 for metal products; and \$390,000,000 for foods. Other important industries include printing and publishing, and the

manufacture of wood products, machinery, and textiles.

Currency and Banking. The basic monetary unit of Norway is the krone (5.3 kroner equal U.S.\$1; 1978). The krone is divided into 100 units, called øre. The central bank is the government-owned Bank of Norway (Norges Bank). The only bank entitled to issue bank notes, it also has great influence on the monetary and credit policy. Savings banks are an old institution in Norway, and the country has about 420, in addition to about 30 commercial banks.

Commerce and Trade. Norway is very dependent on foreign trade, which is responsible in large measure for the high standard of living. The principal imports are machinery and equipment, base metals, fuels, textiles, and chemicals. Principal exports include pulp and paper products, machinery and transport equipment, mineral fuels and lubricants, fish and fish products, and base metals. In the mid-1970's annual imports were valued at about \$11 billion, and exports at \$8 billion. The three most important trading partners are Sweden, Great Britain, and West Germany. Other important trading nations are the United States, Denmark, and the Netherlands. A member of the European Free Trade Association (q.v.), Norway sought membership in the European Economic Community (q.v.), but in a 1972 referendum the people rejected it.

Transportation. Rugged topography, sparse population, and high construction costs preclude extensive highway and rail construction in large parts of the country. Only the S.E. has a substantial transportation network. More than 47,000 mi. of roads and highways exist, but only about 10,000 mi. are paved. The largely state-owned railway system, with a total length of some 2700 mi., is about 60 percent electrified. Ships provide important coastal connections, and an express steamship route provides daily north-south connections for all important ports between Bergen and Kirkenes.

The Norwegian merchant marine, totaling about 28,000,000 gross tons in the mid-1970's, ranks fourth in the world. Almost 90 percent of the fleet is engaged in foreign service, 5 percent in coastal trade, and 5 percent in fishing. Emphasis has been placed upon tankers in the postwar additions to the merchant marine.

Domestic air service is provided by two private companies. The Scandinavian Airlines System (SAS), an international air service, is operated jointly by Sweden, Denmark, and Norway.

Communications. The communications system (including radio and television) is controlled by the state through the board of tele-

graphs. About 731 radio transmitters are operated by the Norwegian Broadcasting Corporation, and more than 1,300,000 radio licenses were registered in the mid-1970's. Television is available throughout the country; about 1,085,000 television sets were licensed. More than 1,475,000 telephones are in use, and the country has an extensive telegraph network.

Labor. Norway had an almost fully employed labor force in the mid-1970's. It totaled about 1,700,000, of which about one third were in manufacturing, construction, and related industries. Labor is highly organized. Forty national unions, constituting the Federation of Trade Unions, have about 655,000 members. Labor disputes are generally settled through negotiations between the trade unions and the employers. Although strikes are legal, they are rare. A system of compulsory arbitration, enacted into law in 1966, gives a national wages board the authority to impose a settlement in labor disputes.

GOVERNMENT

Norway is a constitutional, hereditary monarchy. The constitution, enacted on May 14, 1814, has been amended many times.

Central Government. Executive power is vested in the king and in the cabinet of ministers headed by the prime minister. The king makes all governmental appointments on the recommendation of the party in power and exercises a veto power over parliamentary legislation. His veto is reversible if the particular bill is enacted by three successive parliaments.

HEALTH AND WELFARE. Health insurance, which has been in effect since 1911, is mandatory for all inhabitants. The state, employers, and the insured all contribute to the fund to cover health benefits. Hospital care is available at no charge for unlimited periods of time. Accident insurance is provided for industrial workers, fishermen, and seamen. Unemployment insurance is available to most employed people under seventy years of age. Persons over seventy years old may qualify for old-age pensions. Legislation provides also for military-compensation insurance, war pensions for military personnel, and many other types of social-welfare benefits.

Legislature. Legislative authority is vested in a parliament called the *Storting*, which consists of 155 representatives elected by the people every four years. All citizens twenty years of age and over are entitled to vote. The constitution provides that two thirds of the *Storting* membership must come from rural electoral districts and one third from urban electoral districts. The members of the *Storting* elect one quarter of

their members to make up the upper house, or *Lagting*, and the remainder comprise the lower house, or *Odelsting*. The *Lagting* consists of 38 members, and the *Odelsting* has 112 members. All prospective legislation must be considered by the two bodies separately, and, if they do not agree, a two-thirds vote of the entire *Storting* is necessary for passage.

Political Parties. The Labor Party is the strongest party and formed all governments between 1935 and 1965. Its program calls for a planned economy and nationalization of major industries. The other major parties are the Conservative Party, which advocates free enterprise; the Center Party, which represents rural interests; the Christian People's Party, which advocates the application of Christian principles to the solution of political problems; the Liberal Party, which represents an amalgam of many diverse groups, including some that favor free enterprise and some that favor a planned economy; the Socialist People's Party, which advocates disarmament and movement toward socialism; and a small Communist Party.

Local Government. Each of the nineteen counties of Norway is headed by a cabinet-appointed governor. The counties are divided into a total of 454 municipalities, of which 47 are urban and 397 rural. Each rural municipality is made up of districts, which have their own popularly elected councils. The chairmen of all the district councils meet annually to form a provincial council, which in turn appoints a four-member executive committee that meets under the chairmanship of the provincial governor. In the urban municipalities the voters elect a city or town council, headed by a chairman, who has the same functions as those of a mayor. A fourth of the council is elected by the entire membership to serve as an executive committee, which supervises the operations of the city administration. In both urban and rural municipalities the local governments engage in many activities, covering social and cultural affairs, public development, and municipal services.

Judiciary. The highest judicial body is the supreme court (*Høyesterett*), which meets in Oslo. At the local level civil cases are considered by a conciliation board of three laymen elected by the town or county council. If mediation fails, the matter goes to a county or town court presided over by a professional judge; these are also courts of first instance for criminal cases. Five courts of appeal hear both civil and criminal cases and are courts of first instance if the offense in question calls for a maximum sentence of more than five years.



Farmers harvesting grain in the Morgedal Valley. Although only a minute fraction of Norway's terrain is suitable for agriculture, it is one of the country's important industries.

J. L. Stage-Photo Researchers

Defense. The king is commander in chief of the armed forces, which total about 37,000 for army, navy, and air force. A term of military

service is compulsory for all male citizens at the age of twenty. The period of training is twelve months for the army and 15 months for the navy and air force. On completion of training, many elect to serve in the Home Guard, which has a strength of about 70,000 and serves local areas. The defense of Norway is also bound up with

the North Atlantic Treaty Organization (q.v.), which the country joined in 1949. In the early 1970's, Norwegian defense expenditures totaled about \$700,000,000 annually.

HISTORY

According to archeological research, Norway was inhabited as early as 14,000 years ago by a hunting people with a paleolithic culture derived from western and central Europe. Later, colonies of farming people from Denmark and Sweden were established in the region. These settlers spoke a Germanic language that became the mother tongue of the later Scandinavian languages. The new arrivals settled around the large lakes and along the coasts. Mountains and fjords formed natural barriers around the various settlements, which, remote from each other and almost inaccessible by land, became independent, each recognizing only the authority of its chief. In time social life in the separate settlements came to be headed by an aristocracy and, eventually, by petty kings. By the time of the first historical records of Scandinavia, about the 8th century A.D., approximately twenty-nine small kingdoms, called *fylker*, existed in Norway.

Inevitably the kings turned their attention to the sea, the easiest way of communication with the outside world. Ships of war were built and sent on raiding expeditions, initiating the era of the Vikings; see NORSEMEN. The Northern sea rovers were colonizers and explorers as well as plunderers. During the 9th century they established colonies in Ireland, Britain, and Iceland, and in the Orkney, Faeroe, and Shetland islands. About a century later they colonized Greenland, from which, about 1000, Leif Ericson set sail on the first voyage to the American coast. Bands of Norwegian Vikings penetrated Russia, and their fleets visited Rome, Constantinople, and the Orient. Everywhere they became famous as great warriors, and in some cases they settled in foreign countries, notably in France, where Vikings became the ancestors of the Normans; see NORMANDY. Their complicated religious mythology, in which brave deeds in battle were extolled and warriors killed in combat were admitted to Valhalla (q.v.), or heaven, symbolized the way of life of the Norwegian Vikings; see SCANDINAVIAN MYTHOLOGY.

In the 9th century the first successful attempt to create a united Norwegian kingdom was made by the king of a *fylke* near Vestfold, a county in the southeast. During several generations this royal family acquired all the country south of the Dovrefjell through inheritance, marriage, and conquest. Harold I, who suc-

ceeded to the throne of this kingdom in 860, established his supremacy over all Norway in 872. Norway's unification was short-lived; at Harold's death in 933 about twenty of his sons divided Norway, with Eric Bloodaxe (d. 954?) as overking. Dissensions and wars among the heirs disrupted the temporary unity. Moreover, many of the petty rulers refused to surrender their independence, and warred continually against the descendants of Harold. In addition to the domestic struggles, both Denmark and Sweden were attempting to acquire Norwegian territory.

In 995 Olaf I, a great-grandson of Harold I, became king. Before his accession Olaf had lived in England where he had been converted to Christianity. He ascended the throne with the firm purpose of forcing Christianity on Norway and was partially successful. Several years after his accession he quarreled with Sweyn I, King of Denmark; in a naval battle at Svöld, Olaf was defeated by the combined Danish and Swedish fleets, supported by disaffected Norwegian chiefs. Olaf was killed in the battle, and Norway was divided by the coalition. After a short period of disorder the country was reunited by Olaf II, who drove out the foreigners and made himself king of Norway in 1016. He continued the religious work of his predecessor, using the sword against all who refused to be baptized. By about 1025 Olaf was more powerful than any previous Norwegian king had been. He aroused the enmity of the powerful nobles, who, together with Canute II, King of England and Denmark, in 1028 drove Olaf into exile in Russia. Two years later Olaf returned and was killed in battle.

Native Kings. On the death of Canute in 1035, Olaf's son, Magnus I, was called from Russia by partisans of his father. He became king and then united Denmark and Norway under his rule. For the next three centuries a succession of native kings ruled Norway. Although internal confusion and wars between rival claimants to the throne disrupted the country intermittently, Norway began to emerge as a united nation, enjoying a comparative prosperity brought by its great trading fleets. The Norwegians had become strongly Christian and a powerful clergy was one of the strongest influences in the kingdom. In 1046 Magnus made his uncle Harold Haardraade coruler. At the death of Magnus one year later, Harold became king as Harold III; he was killed while participating in the invasion of England in 1066. The last king of the line of Harold III was Sigurd I (1089?-1130), whose rule lasted from 1103 until his death in 1130.

Dynastic conflict followed the death of Sig-

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urd. Of the many later kings, the most notable was Sverre (1152?–1202), king from 1184 to 1202. A statesman of great ability, Sverre built a strong monarchy, and considerably weakened the power of the clergy and the great nobles. Under Haakon IV Haakonsson, who ruled from 1217 to 1263, Norway reached the apex of its medieval prosperity and political and cultural power. Iceland was completely subjugated, and a written Norwegian literature and a legal code were considerably developed in the 13th century. Royal authority was greatly increased by Haakon and his son, Magnus VI; the landed aristocracy was virtually crushed and even the title of *lendermaend*, or baron, was abolished in 1308 by Haakon V Magnusson (1270–1319). The old noble families gradually descended to the economic status of well-to-do peasants, and for the most part the Norwegian people became a nation of peasants. Commercial activity declined because of the increasing power of the Hanseatic League (q.v.) of northern German cities. The death of Haakon V in 1319, without male heirs, gave the throne to Magnus II, King of Sweden, the three-year-old son of Haakon's daughter. In 1343 Magnus was succeeded by his son, Haakon VI Magnusson (1339–80), and in 1380 the latter's son, Olaf II, King of Denmark, became king of Norway as Olaf IV. The young king (then ten years old) exercised only nominal rule, the power being in the hands of his mother, Margaret I (q.v.), daughter of Waldemar IV Atterdag, King of Denmark (1320?–75). Olaf died in 1387 and was succeeded by his mother as ruler of Norway and Denmark and, in 1389, of Sweden also. In order to obtain German support against the dukes of Mecklenburg, who claimed the Swedish throne, Margaret had her grand-nephew, Eric of Pomerania, elected nominal ruler as Eric VII, King of Denmark and Norway (1382–1459).

Union with Denmark and Sweden. By the Union of Kalmar in 1397, the three kingdoms were made a single administrative unit, and following the death of Margaret in 1412, Eric became king of Sweden as Eric XIII. Norwegian prosperity and culture declined steadily after the union. Moreover, the plague, called the Black Death, swept Norway in the 14th century, decimating the population. Sweden and Denmark were larger and wealthier than Norway, and the kings, for the most part, ruled solely in the interest of Sweden or Denmark. Sweden left the union in 1523, and during the subsequent three centuries Norway remained stagnant under the tyranny of Danish officials.

The Napoleonic Wars (q.v.) at the beginning

of the 19th century finally occasioned the end of the union. After the defeat of Napoleon I, Emperor of France, in 1814, Denmark, an ally of France, was compelled to sign the Treaty of Kiel, ceding Norway to Sweden. The Norwegians, however, disavowed the Treaty of Kiel. They declared themselves an independent kingdom, drew up a liberal constitution, and offered the crown to the Danish crown prince Christian Frederick. The Norwegian move was disapproved by the European powers, and, at the head of an army, Marshal Jean Bernadotte, later Charles XIV John, King of Sweden and Norway, persuaded Norway to accept the Treaty of Kiel. Christian Frederick, after reigning for three months, was forced to abdicate the Norwegian throne; he later became king of Denmark as Christian VIII. In return for this acceptance, Norway was allowed to retain the newly promulgated constitution. By the Act of Union of 1815, Norway was given its own army, navy, customs, and legislature, and permitted full liberty and independence within its own boundaries.

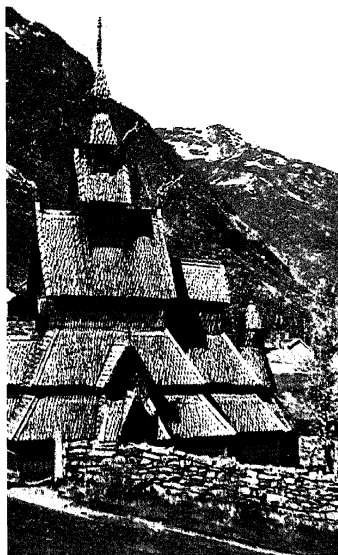
Second Union with Sweden. The Norwegian Storting, or legislature, was chiefly occupied, on the period after 1814, in stabilizing and improving the financial condition of Norway and in implementing and guarding her newly won independence. Despite the bitter opposition of Charles XIV John, an autocratic monarch, the Norwegian legislature passed a law in 1821 abolishing the Danish-created peerage, a vestige of the onerous Danish rule. The Storting held that the true Norwegian nobility were the peasant descendants of the medieval barons. Norwegian nationalism increased, and the movement for greater independence was headed by the Peasant Party, preeminent in the Storting. During the post-Union period, the Storting complained that Swedish treatment of Norway was not consistent with the spirit of the Act of Union and with the status of Norway as a sovereign state. At length, in 1839, Charles XIV John appointed a joint committee of Swedes and Norwegians to revise the wording of the Act of Union. Charles died in 1844, before the committee submitted its report. The new Swedish king, Oscar I, more liberal than his father, admitted the justice of many Norwegian claims and made himself popular by granting Norway a national flag for its navy, though the flag bore the symbol of union with Sweden.

The liberal movement in Norwegian politics, accompanying the surge of nationalism, became more pronounced after the revolutions of 1848 in the major countries of Europe. Political nationalism was bolstered by intellectual and cul-



Norway. Plate 1. The midnight sun. The northern areas of Norway, within the Arctic Circle, experience periods of continuous daylight in summer.

Picture Plates 1 and 2. Norwegian Information Service



Left: A stave church of timber, typical of Norwegian church architecture of the Middle Ages. Above: Ruins of a church in Hamar, in eastern Norway; dating from 1150, the structure was burned in 1567 when the Swedes destroyed the city.

Norway. Plate 2.

Below: The 13th-century Hakonshallen, or Old Hall, of Bergen. Built when the city was the capital of Norway, the hall is still used for official occasions. Right: A bride (center) and her attendants wear traditional costumes in the city of Hardanger, on the west coast.



tural nationalism. The poet Henrik Arnold Wergeland became the leader of the nationalistic Young Norway Party. Norwegian folk songs were collected and arranged and became extremely popular. Norwegian dictionaries, histories, and grammars were compiled. The literary renaissance, designed to eliminate the lingering Danish culture, included such writers as Henrik Ibsen, and Bjørnstjerne Bjørnson, and Jonas Lie (1833–1909). In their wake came writers such as Knut Hamsun and Sigrid Undset, the composer Edvard Grieg, and the violinist Ole Bornemann Bull (1810–80).

As their national policy, the Norwegians maintained their refusal to permit closer relations with Sweden than those provided by the Act of Union. When, in 1860, Sweden began to propose revisions in the Act designed to give the ruling country additional powers, the two greatest Norwegian political parties, the Lawyers Party and Peasant Party, combined to form the Venstre ("Liberal") Party, and blocked the revisions. Another significant controversy between the two countries was occasioned by renewed Swedish attempts at constitutional revision, including establishment of the royal right to dissolve the Storting. Led by Johan Sverdrup (1816–92), president of the Storting, the Norwegian legislature engaged in a long struggle with Oscar II, King of Sweden and Norway. Oscar was forced to yield in 1884. Norwegian policy then centered on demands for a separate consular service and a Norwegian flag for the merchant marine without the symbol of Union. The flag was approved by Sweden in 1898, but Sweden balked at the demand for a consular service. In 1905, after protracted negotiations, the Norwegian ministry then in office resigned and subsequently refused Oscar's request that they withdraw their resignations. As a result the Storting declared that, because the king had been unable to form a new government, the constitutional royal power had ceased to function and Oscar was no longer ruler of Norway. Norway was proclaimed an independent kingdom and in a plebiscite in August, 1905, the Norwegian people voted overwhelmingly for separation from Sweden. The Swedish Riksdag ratified the separation in October. A month later Prince Carl of Denmark accepted the Norwegian crown as Haakon VII.

Independence. The Norwegian government, dominated by ministers with liberal politics, became one of the most advanced in Europe in matters of social legislation, education, and political liberties. In 1907 Norwegian women became the first in Europe to be given the voting

franchise. Unemployment insurance benefits, old-age pensions, and liberal laws concerning divorce and illegitimacy made Norway famous for its advanced social policies.

After the beginning of World War I in 1914 the sovereigns of Sweden, Norway, and Denmark agreed to maintain the neutrality of the Scandinavian countries and to cooperate for their mutual interest. The policy of neutrality and friendship thus established continued to be joint policy after the war. The world economic depression that began in 1929 affected Norway considerably because of its dependence on commerce, but the crisis was less crucial than it was in larger countries such as the U.S. and Great Britain. The Labor Party was elected to power in 1935 and continued the policies of moderation and political liberalism that had dominated Norwegian politics since 1905.

World War II. Norway maintained its traditional neutrality when World War II began in 1939. Despite Norwegian sympathy for Finland during the Russo-Finnish phase of the conflict, Norway abstained from voting in the League of Nations assembly that expelled the U.S.S.R. in December, 1939, and it rejected, in 1940, an Anglo-French demand for transit of troops to aid Finland. German sinking of Norwegian ships and maritime warfare along the Norwegian coast made neutrality increasingly difficult. On April 8, 1940, Great Britain and France announced that they had mined Norwegian territorial waters to prevent their use by German supply ships. Germany invaded Norway the next day.

Assisted by German soldiers disguised as tourists, the Nasjonal Samling (National Union) party, and disloyal Norwegian army officers, the Germans attacked all important ports. Major Vidkun Quisling, head of the Nasjonal Samling, proclaimed himself head of the Norwegian government on April 9. Haakon and his cabinet, after an unsuccessful attempt to direct resistance to the German army, withdrew to Great Britain in June. For five years thereafter, London was the seat of the Norwegian government-in-exile. Norwegian political leaders in Norway refused to cooperate in any way with Josef Terboven (1898–1945), the German commissioner for Norway. On Sept. 25, 1940, Terboven dissolved all political parties except the Nasjonal Samling, set up a so-called National Council composed of the party members and other German sympathizers, and announced the abolition of the monarchy and the Storting. Quisling, as head of the government, then began to employ terrorist methods, such as secret police, concentration

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camps, massacres of Jews, censorship, and mass arrests and executions. These repressive measures did not decrease the mass resistance of the Norwegian people.

Large-scale sabotage and espionage by Norwegians on behalf of the Allies, and the increasing resistance to Quisling were met by increasing government terrorism; martial law was proclaimed by Quisling in September, 1941. The leaders of the resistance movement in Norway cooperated closely with the government-in-exile in London, preparing for eventual liberation. During the Allied advance on the European continent in early 1945, the German forces in Norway surrendered on May 8. Haakon returned to Norway on June 7. To punish traitors, the death penalty, abolished in Norway in 1876, was restored. Terboven and other leading German sympathizers committed suicide, and Quisling was tried and executed for treason.

The government-in-exile resigned after temporary order was established. In the general elections of October, 1945, the Labor Party won a majority of votes, and a labor cabinet was headed by Einar Henry Gerhardsen (1897–). **International Affairs.** Norway became a charter member of the United Nations in 1945, became a participant in the European Recovery Program in 1947, and joined the North Atlantic Treaty Organization (q.v.), or NATO, in 1949. This last action, representing abandonment of Norway's traditional neutrality, was approved wholeheartedly by the Norwegian people in general elections held on Oct. 10.

In 1950 Premier Gerhardsen resigned and was succeeded by Oscar Torp (1893–1958), a Laborite. During 1952 Norway continued its firm support of the policies of NATO. In a general election held in October, 1953, the Labor Party retained its absolute parliamentary majority.

Einar Gerhardsen resumed the premiership on Jan. 14, 1955, following the resignation of Oscar Torp. The main problem confronting the Gerhardsen government was the chronic foreign-trade deficit. In April the deficit was partly alleviated by loans, totaling \$40,000,000, from the World Bank (see INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT) and U.S. sources. **Recent Events.** King Haakon VII died in September, 1957, and was succeeded by his son, Olaf V. In general elections held in October the Labor Party kept its parliamentary majority.

In February, 1958, the Norwegian Federation of Trade Unions and the Employers' Confederation agreed to reduce working hours from 48 to 45 per week and to increase wages in a compensatory amount. Full foreign convertibility of

Norwegian currency was established in December. In April, 1959, the foreign minister rejected Soviet warnings against the establishment of NATO bases in Norway. Norway and the other six nations in the European Free Trade Association (q.v.) initialed the founding convention in November. In 1960 Great Britain announced that it would henceforth accept a Norwegian 12-mi. fishery limit.

The parliamentary elections held in September, 1961, resulted in the failure of the Labor Party for the first time since World War II to win a majority of the seats, although it kept its place as the leading party. Gerhardsen was designated once again to head the cabinet. In 1965 the Labor Party was defeated in general elections, and for the first time in thirty years a coalition government was formed without the party. Per Borten (1913–), the leader of the Center Party, became prime minister.

In 1970 Norway applied for membership in the European Economic Community (E.E.C.), a move that gave rise to increasing dissension within the government. Early in 1971 Borten resigned after charges were made that he had leaked details of a confidential report on the E.E.C. negotiations. Trygve Bratteli (1910–), the leader of the Labor Party, then formed a minority government that campaigned strongly for E.E.C. membership. In a referendum in 1972, however, the voters vetoed membership. As a result, the government resigned and was succeeded by a centrist coalition headed by Lars Korvald (1916–), leader of the Christian People's Party. In May, 1973, Norway signed a free-trade agreement with the E.E.C. In elections in September, Labor suffered considerable losses, but Bratteli again was able to form a minority government. It was dependent on support from the then Socialist Electoral League (now the Socialist Left Party).

Bratteli resigned in January, 1976, and was succeeded by the Labor Party leader in parliament, Odvar Nordli (1927–). The general election of September, 1977, between socialist and nonsocialist parties was extremely close; after two days of counting and recounting ballots, it ended in continuation of the minority government on the basis of a one-seat Labor-Socialist Left combined majority in parliament.

Norway's conservative parties were among similar parties of nine nations that formed the European Democratic Union, which held its first meeting in April, 1978.

NORWEGIAN ELKHOUND or **ELKHOUND**, sporting or hunting dog that originated in Norway over 6000 years ago. The breed is noted for



Norwegian Elkhound

Walter Chandoha

its ability to hunt big game, including bear and elk as well as lynx and raccoon (q.v.). Its principal use today is to hunt elk in Norway, where it is also frequently employed as a draft animal. The dog is also greatly valued in Norway and in other countries as a pet with unusual intelligence, friendliness, loyalty, and trustworthiness. The Norwegian elkhound is a medium-sized dog, with a short, compact, strongly built body. The male is about 20 in. high at the shoulder, the bitch about 18 in.; the dog weighs about 45 lb. It has a short head; pointed ears; brown eyes; a powerful neck; a broad and deep chest; straight legs; a thick, fairly smooth coat, gray in color; and a short, curled tail that is carried high. **NORWEGIAN LANGUAGE**, language of the people of Norway. This language belongs to the West Scandinavian branch of the Germanic subfamily of the Indo-European languages (q.v.).

Like the other Scandinavian languages, Norwegian is derived from a primitive common Scandinavian language, which can be traced through runic inscriptions to the 3rd century A.D.; see **RUNES**. Because of significant dialectal changes during the Viking age, about 800–1050 (see **NORSEMEN**), Old Norse (or Old Norwegian), a language from which the modern tongue derives, came into being and spread by Norwegian migration to Iceland and other areas in the North Atlantic. The Latin alphabet, replacing runic signs, was introduced with Christianity, and a distinct Norwegian written language evolved in the 11th century. Subsequently, Norwegian was influenced by Danish, Low German, and Swedish. See **DANISH LANGUAGE**; **GERMAN LANGUAGE**; **SWEDISH LANGUAGE**; **SWEDISH LITERATURE**. The Danish influence became dominant during the more than 400 years between 1380 and 1814, during which Norway was united with Denmark

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under the Danish crown; see **NORWAY: History**.

The Danish language, introduced to Norway by government officials, spread after the Reformation (q.v.) through books printed in Denmark and became, in the 16th century, the written language of Norway, being generally spoken by the educated classes, especially in the cities. The Norwegian dialects continued in use in the country districts and among the working and middle classes of the towns. During the 19th century, the spoken Danish developed into a language called Dano-Norwegian, which was chiefly Danish in structure and vocabulary, but akin to Swedish in pronunciation. Later termed *riksmål*, it became the official language of Norway. Dano-Norwegian is the language of such literary figures as the poet and dramatist Henrik Ibsen (q.v.); see **NORWEGIAN LITERATURE**.

Subsequently, however, a strong nationalistic and romantic movement awakened a desire for a language people felt was their own. In response to this desire, the philologist Ivar Andreas Aasen (q.v.) began, in the middle of the 19th century, the construction of a new national language, the *landsmål* ("country speech"), based on Norwegian dialects and free of Danicisms. This endeavor won public support, and the *landsmål*, further developed, became an important secondary language.

Under pressure of the *landsmål* movement, the *riksmål* went through a series of significant reforms (1907, 1917, and 1938) emphasizing strictly Norwegian speech and spelling. The names of the two languages were officially changed: the *riksmål* became the *bokmål* ("book language"), and the *landsmål*, the *nynorsk* ("New Norse"). The two languages have equal validity in law, and both must be taught in the schools. The *bokmål*, still the leading language, is strongest in eastern Norway, the *nynorsk* in western Norway. Changes continue to occur in both languages. J.N.

NORWEGIAN LITERATURE, literature of the Norwegian people, dating from about 800 A.D. to the present. This literature may be grouped into three periods. In the first period (800?–1400?), Norway largely shared its literature with Iceland; in the second (1400?–1814), it generally shared its literature with Denmark; in the third (1814 to the present), it developed an independent literature.

Norwegian-Icelandic Period (800?–1400?). The Old Norse (early Norwegian and Icelandic) literature is essentially a product of the Viking age; see **NORSEMEN**. The deeds, beliefs, history, and lore of the Norwegian Vikings who settled Iceland at the end of the 9th century found ex-



Björnsterne Björnson Norwegian Embassy Information Service

pression in poems, tales, and legends. These were transmitted orally but not written down until the 13th century, chiefly in Icelandic manuscripts; see ICELANDIC LITERATURE.

The oldest literature extant is the group of poems called the *Poetic Edda*. These famous poems tell the tales of Norse and Germanic gods and heroes. Another, more complex and metaphorical type of poetry, known as the skaldic poetry, was composed for oral presentation by skalds (bards or court poets). The earliest known skald was a Norwegian, Bragi Boddason, who lived in the first half of the 9th century. When skaldic poetry ceased in Norway, it continued in Iceland. A somewhat later development of Old Norse literature is the saga, a prose epic or narrative. The sagas were told by the Icelanders, but were not concerned solely with Icelandic events. Thus the renowned *Heimskringla* by Snorri Sturluson (see SNORRI) is a history of Norwegian kings. In general, the sagas are built on and carry forward Norwegian traditions.

In the 13th century the religious and courtly literature of continental Europe reached Norway through translations and adaptations of homilies, legends of saints, and tales of such heroes as Arthur, Charlemagne, and Theodoric (qq.v.). Of prime importance as a Norwegian literary creation was "The King's Mirror", a didactic treatise in verse on manners and morals. The

13th century also saw the emergence of the ballads, which came to flourish in Norway centuries before they were put in writing.

Norwegian-Danish Period (1400?–1814). At the end of the 13th century, Norway entered into a union with Denmark that lasted more than 400 years; see NORWAY: History. The flowering of Old Norse literature had come to an end, and for two centuries little writing was done in Norway. After the Reformation (q.v.) literary activity slowly resumed, with a simultaneous growth of Danish influence. Books printed in Copenhagen made their way to Norway, which had no printing press until 1643. When Danish became the official language in Norway, it was adopted by the Norwegian writers. See DANISH LANGUAGE; NORWEGIAN LANGUAGE. The influence of Humanism (q.v.) was discernible in the writings of Absalon Pedersøn Beyer (1828–75), and Peder Claussøn Friis (1545–1614). The translation by the latter of Snorri's *Heimskringla* stirred patriotic feelings. In the 17th century, the clergyman Petter Dass (q.v.) wrote "The Trumpet of Nordland", a long topographical poem, describing northern Norway with zest and vigor.

During the 18th century Norway contributed significantly to the common literature of the twin kingdoms. The leading writer was Ludvig Holberg (q.v.), who was born in Norway and retained many of his Norwegian characteristics although he did his life work in Denmark. Having traveled widely in Europe, he brought to the Nordic countries impulses from French rational-

Henrik Ibsen

Norwegian Embassy Information Service



ism and English Deism (qq.v.). Holberg wrote important historical works, satirical poems, and moralistic essays, but became most famous for his comedies, classical plays that are still performed in both Norway and Denmark. Among Holberg's successors, Johan Herman Wessel (1742–85), known for his tragicomedy *Love Without Stockings*, was the most outstanding. Other writers of the period were the poets Christian Braunman Tullin (1728–65) and Johan Nordahl Brun (1745–1816), and the critical essayist Claus Fasting (1746–91).

Independent Period (1814 to the present). As a result of the Napoleonic Wars (q.v.), Norway became separated from Denmark and united with Sweden, with qualified independence. Although Norway did not break all its cultural ties with Denmark, a strong movement for the creation of a national Norwegian literature arose. It was led by the poet and dramatist Henrik Arnold Wergeland (1808–45). As an editor and educator who fought the Danish tradition, he is considered the founder of Norwegian literary culture. His opponent, the poet Johan Sebastian Welhaven (1807–73), became a spokesman for the continuation of Danish culture.

The national-romantic trend also led to the discovery of the oral popular literature as exemplified in the collections of folk tales gathered by the poets Peter Christian Asbjørnsen (1812–85) and Jørgen Moe (1813–82). The philologist Ivar Andreas Aasen (q.v.) began the study of Norwegian dialects, and the poet and journalist Aasmund Olafsson Vinje (1818–70) proved that the country speech was well suited for poetry. The glories of early Norwegian history were extolled by the historian Peter Andreas Munch (1810–63). The novelist Camilla Collett (1813–95), on the other hand, foreshadowed the coming literary realism in her novel *The Governor's Daughters* (1854–55).

A new generation of writers, headed by the great dramatist Henrik Ibsen and the writer, theater director, and political leader Bjørnstjerne Bjørnson (qq.v.), reflected in their early works the national-romantic movement, but later turned to realism and social criticism. Ibsen probed man's aspirations and limitations in historical, poetical, realistic, and symbolic plays, gaining world fame with such masterpieces as *Brand* (1866), *Peer Gynt* (1867), *A Doll's House* (1879), and *The Master Builder* (1892). Bjørnson, a writer of boundless vitality, gave expression to a philosophy of growth in stories, novels, plays, and poems, and was active as a public-spirited reformer.

Other outstanding representatives of Norwe-



Knut Hamsun

Norwegian Embassy Information Service

gian realism were Jonas Lie (1833–1908), a novelist whose style ultimately took an impressionistic turn, and Alexander Kielland (1849–1906), whose novels and short stories displayed debonair wit. Naturalistic pessimism characterized the novels of Amalie Skram (1846–1905), while changing intellectual and spiritual views were voiced in stirring novels by Arne Garborg (1851–1924).

In the nineties, a neoromantic movement began. Lyric poetry came to the forefront and flourished in the works of Nils Collett Vogt (1864–1937), Vilhelm Krag (1871–1933), and, especially, Sigbjørn Obstfelder (1866–1900). Artistic individualism and satire prevailed in the plays by Gunnar Heiberg (1857–1929). In short stories and novels Hans Kinck (1865–1926) stressed the interplay of man, race, nature, and society. The greatest writer of the period was Knut Hamsun (q.v.), an individualist of exceptional sensibility, drawn by the subconscious and irrational.



Sigrid Undset

Norwegian Embassy Information Service

The peaceful dissolution of the union of Norway with Sweden in 1905 inaugurated a period of rapid progress. New important writers emerged, most of them following a resurgent realism concerned with social problems. Olav Duun (1876–1939) reached his zenith with *The People of Juvik* (1918–23), a novel of rural life. Johan Bojer (1872–1959) became known for his novels on the new industrial morality. Johan Falkberget (1879–1967) depicted mining life and was praised for his epic work *Christianus Sextus* (1917–35). The greatest fame, however, came to Sigrid Undset (q.v.), whose trilogy *Kristin Lavransdatter* made medieval Norway come alive through characters drawn with modern psychological insight. Among outstanding poets of the period were Herman Wildenvey (1886–1959);

Olaf Bull (1883–1933); Olav Aukrust (1883–1929); and Olav Nygard (1884–1924).

The new generation of writers active between the two world wars was much affected by ideological conflicts and international tensions. The tone was set by the poet Arnulf Øverland (1889–1968), the novelist Sigurd Hoel (1890–1960), and the dramatist Helge Krog (1889–1962). The novelist Ronald Fangen (1895–1946) held conservative views. Internationally known Tarjei Vesaas (1897–1970) wrote novels with a strong lyric undercurrent. The Danish-born Aksel Sandemose (1899–1965) was recognized for his searching psychological novels. Nordahl Grieg (1902–43), a novelist, dramatist, and poet, reflected the fluctuating moods of the interwar period. Like Øverland he wrote poems against the German occupation during World War II.

In the postwar period, the occupation and its problems formed the themes of many writers, including such new authors as Sigurd Evensmo (1912–), Jens Bjørneboe (1920–), and Kåre Holt (1917–). European literary modernism slowly made its way to Norway. Among new prose writers, Finn Carling (1925–) and Solveig Christov (1918–) have used symbols in an individual manner. Tor Jonsson (1916–51) wrote significant poetry in *nynorsk* ("New Norse"). Despair and hope mingle in the poetry of Gunnar Hofmo (1921–). Among the modernists are Claes Gill (1910–73), Paal Brekke (1923–), Peter Holm (1931–), and Stein Mehren (1935–). The newest generation of Norwegian writers, represented in the two annuals *Gruppe 66* and *Gruppe 67*, has been characterized as serious and discontented, and more concerned with criticism of society than with stylistic experimentation. J.N.

See separate articles on those individuals whose birth and death dates are not given.

NORWEGIAN MUSIC. See *NORWAY: The People; Culture: Music.*

